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ONE way of swelling the production of the mining districts is by reporting the yield in ounces of bullion regardless of its fineness. This is done in South Africa, where the bullion from even the cyanide process, which after refining is only 600 to 650 fine, is entered in the production as if it were ounces of gold, or an alloy of gold and silver. Although values are reported as well as weights, it would be more satisfactory if the returns were made in ounces of pure gold.

It is reported in Butte, Montana that the Henry mine in Missoula Gulch has encountered a vein similar in its characteristics to the silver-copper vein of the Gagnon mine of the Colorado Mining and Smelting Company, and has consequently proved the continuance of these bodies further west than had been anticipated. If results prove that this opinion is correct this discovery will prove of great value to Butte as it will open up a large territory for prospecting which heretofore has been somewhat neglected, although it is locally supposed that the Gagnon's prospecting drifts have passed in every direction outside of the company's boundaries.

THE Ontario Silver Mining Company, after declaring 197 almost consecutive dividends, has decided to pass the regular one for October. The low price of silver, excessive cost of the long drain tunnel now being run, as well as the reduced grade of the ore, has decided the management to this. That this cessation of dividends does not mean an absence of profits and that it is but temporary there is no doubt. Not only there is a large quantity of low grade ore available in the mine, but below the levels now worked and which will be drained by the new tunnel, large virgin bodies, of comparatively high grade ore, are known to exist. The management is provident and has always maintained a reserve fund for contingencies, which has helped to pay the regular dividends during the decline in the value of silver. This fund, which amounted to over \$400,000 at the end of 1891, has been reduced considerably and it will now be allowed to grow until it assumes such proportions as will allow the payment of regular dividends.

THE HISTORY OF A PLACER MINE—THE LEMHI GOLD PLACERS.

We have been favored with considerable correspondence from gentlemen in Denver, whose names were mentioned in the brief history of this company published in our issue of October 22d. Several of these gentlemen, Messrs. BOAL and JACKSON, lawyers of Denver, and H. E. WOOD, assayer, all men of good professional standing in their community, assure us that so far from disposing of their stock, they have retained the greater portion of their interests throughout the vicissitudes of the company. While we take great pleasure in placing on record this expression of their confidence in the scheme, an inspection of our editorial will show that we have made no assertion to the contrary, and that our statements of facts were correct. That results did not come up to expectations everyone knows, but we believe that in the future we shall have more favorable news to record of this property.

AUGUSTUS BOWIE, whose favorable report we mentioned in our former article, has given his opinion, after a careful examination, that the ground covered by his report will yield 20 cts. per cu. yd., thus virtually confirming Mr. H. E. WOOD's report as to the average of these grounds and that the operating expenses will vary from 45% to 52% of the yield. Mr. BOWIE makes a number of important suggestions to the company, which no doubt will be carried out under his efficient supervision as consulting engineer.

In conclusion we may say that the ENGINEERING AND MINING JOURNAL takes the utmost pleasure in recording successes in that industry of which it is representative, and while frequently called upon to criticize injudicious operations, it does so from a desire to further the best interests of mining.

IMPROVEMENT IN COKE.

In the last number of the JOURNAL we pointed out the principle underlying the improvement in coke due to mere pulverization of the coal. We now show what may be done by washing it.

Pulverization, whether of run of mine or slack, as was shown, acts almost solely in the direction of physical betterment of the coke, by distributing the ash more uniformly and increasing its strength. The impurities are either not diminished at all or so slightly as not to affect the chemical composition. After pulverization the same amount of ash and of sulphur is present as before, and goes with the coal into the oven. The improvement in coke is positive, no matter what may be the content of ash and sulphur, but is not due to any change in quantity or quality of either of these ingredients. If the market for coke is not sensitive to ordinary amounts of sulphur, but is so as regards strength and uniformity, then pulverization may be all that is required, and washing will increase the cost without increasing the selling price.

Coke from washed coal will cost more than ordinary coke, and if it commands no more in the market there is no reason why the works should make it. It is generally accepted that with proper care in the mining the

standard Connellsville and Flat Top coals do not need to be washed for the production of high-grade coke. In these districts careful mining insures a first-rate product, whether for steam, domestic or coking purposes, the last, of course, requiring the greatest care. But with the more southerly coals the case is different, so different, indeed, that it is probable that every ton of coke now made of unwashed coal in Tennessee, Georgia and Alabama is much below the quality that could be obtained from washed coal.

The growth of a new industry and the enlargement of the sphere of operations of an established one are alike subject to commercial rather than to scientific considerations. The question as to whether it will pay is not only the most pressing, it is also the first, and must be settled before any other is taken in hand.

If run of mine coal is screened over $\frac{1}{2}$ in. bars and the slack sent to the washers, as is customary at some works, it would require an output, per day, of 250 to 300 tons "slack" to operate 100 ovens. Where miners are paid "over the screen," the company gets the slack at very low figures, and the cost of washing, per ton of coal, is much less than at works crushing run of mine and then washing.

We have in mind now a company profitably engaged in mining coal and making coke of washed slack. They produce about 40,000 tons of coal per month, and 2,000 tons of coke. Taking the yield of the coal in coke at 50 per cent., the 2,000 tons of coke represent 4,000 tons of slack coal. This would give a yield of slack of about 25 per cent., the coal being nearly all machine mined. Seventy-eight per cent. of the removable dirt in the slack is taken out in washing, and there is a reduction in the ash of 20 per cent. and in the sulphur of nearly 25 per cent. We are informed by another company that they have obtained in regular work on run of mine coal, crushed to pass $\frac{1}{2}$ inch bars before going to the first revolving screen, a reduction in the ash of 50 per cent. and in the sulphur of the same, reckoning on the coke. That is, the coke made of unwashed coal contained 16 per cent. ash and 2.25 per cent. sulphur, which figures were reduced to 8 per cent. and 1.12 per cent., respectively.

In our own practice we have not obtained such favorable results, but it must be stated that the coal used was very dirty and carried a good deal of sulphur, the removable dirt being 12 $\frac{1}{2}$ per cent., and the sulphur over 4 per cent. In our operations the dirt was reduced in the washed coal to 2 $\frac{1}{2}$ per cent., and the sulphur to something over 3 per cent., while the loss of coal was not quite 1 $\frac{1}{2}$ per cent. This experience was based on the washing of about 9,000 tons of slack, so that the results are not to be considered experimental. The plant has been in operation about twelve months, and the results during the period compare closely with those given. During the last eight months the plant has washed 35,000 tons of slack, all of which has been coked in the bee-hive oven.

LABOR AND CONTRACT.—II.

The present question is not whether the system of contract ought to give way to some other social organization, but whether, in a community confessedly organized upon that system, and likely to remain so, the contracts of certain classes of wage-earners should not be recognized as obligatory, because they are not free, the workers being coerced into the acceptance of them. And the particular form of State interference, which I have taken for illustration, is the fixing by law of minimum wages. We have seen that there is no ground for such a proposal in the actual condition of the vast majority of wage-earners, and certainly none among the organized trades. But there are wage-earners, who unquestionably have felt the operation of Ricardo's "law of wages," and have been brought to accept terms which barely support them. As an instance, we may take women who try to earn a living with the needle. Concerning such classes I venture to say:

1. That they do not constitute a large part of our wage-earning population is demonstrated by the failure in this country of the schemes of co-operative distribution which have been so successful abroad. Co-operative stores are not generally patronized by our workingmen and their families, for the simple and confessed reason that they and their wives prefer to trade freely, making their own bargains, and "shopping" like other people, and that they can afford to indulge this preference. They are not earning "starvation-wages."

2. In those branches characterized by the lowest wages, the causes are notoriously the lack of skill and the competition of the unskilled. Women who cannot sew well and rapidly, receive starvation-wages at rates for piece-work upon which the skillful operators do much better. Madame Demorest put this case clearly, some years ago declaring that she was in continual need of skilled needlewomen at good wages, and could not find them among the unskillful and untrustworthy crowds of so-called needlewomen.

3. Now, there is no doubt of the genuine hardship endured by many sufferers of this class. They deserve both sympathy and help. But I do not see that they would be helped by a law fixing the minimum rate of their wages. No law could force the employer to engage them. He would have to select his employes from a crowd of applicants, and if he were

forbidden to take the less competent at lower rates, he would take the skillful at the legal rate.

4. In a word, any law prescribing a minimum wage is a burden laid upon the very workers who suffer most already. It forbids them to work for less pay; but that would tend to leave them with no work at all. It is certainly no great achievement of benevolence to relieve "pauper labor" by making pauper idleness out of it.

5. Moreover, in the case of working-women, a large part of the actual suffering is not even the result of a real coercion, such as the law could fairly recognize. The occupation of household service offers to women comfortable homes, wholesome food, and wages out of which they can, and do, lay up money. The demand is insatiable, even for those who are wholly inexperienced. It is one of the rare occupations in which beginners are housed, fed, instructed, and paid besides. If women prefer the independence of living in tenement houses and working for "starvation wages," the sentiment which inspires them may be natural and admirable, but they cannot fairly call upon the community to enable them to indulge it. They are not working under the cruel alternative of starvation, they are choosing semi-starvation rather than an honorable and useful occupation which they do not like.

6. Parallels could be cited from other classes. The crowding of unskilled labor into our cities, while farmers need help and cannot get it, is a familiar spectacle; and it may fairly be asked, when a multitude of applicants for work persist in crowding a field which is not large enough for all, whether the part of wisdom is to encourage them in that folly, or to let its natural results work its cure. The relief of immediate physical suffering is a function of charity which no one would repudiate; but the most truly charitable know most thoroughly, how easy it is to encourage by relief the causes of such suffering. Voluntary private benevolence makes such mistakes continually; but there is this compensation, that, upon discovery of the resulting evil, the mistaken means can be corrected at once. It would be much more serious folly to generalize and perpetuate, in the form of law, the occasional and temporary blunders of well-meaning individuals.

7. We have not far to look in order to find proof of the effect of such a law. For certain occupations and in certain localities the law already exists and is enforced with bloody severity. The members of the labor unions not only assume its burdens voluntarily for themselves, but enforce it upon others by terrorism, violence and murder. The result is to prohibit, more thoroughly than any decently humane law could do it, the giving of work in certain lines to those who want it and need it most, and who could get it if not thus illegally prevented. The army of the unoccupied is thus directly increased by irresponsible tyranny, and while the workers are oppressed work is made scarcer by the stoppage of many enterprises which cannot bear the extra burden thus imposed.

I have obtained from Idaho the following interesting document, which was made public during the recent legal proceedings concerning the operation of the miners' union in the Cœur d'Alene district. It is declared to be the oath taken by the members of that society.

"I,, do solemnly swear, in the presence of the Almighty God, before all the members present, that I will be a true and faithful member of the unions of the Cœur d'Alene already organized, or that may be organized hereafter, all under the jurisdiction of the Central Union.

"I do further swear that I will not appropriate any of the funds of the union to my own personal benefit; that I will not divulge any of the secrets or secret workings of this union, whether I remain a member of this union or not; that I will work faithfully and fervently to further the interests of the unions, but never, at the peril of my life, act as a traitor or spy to this or any of the Cœur d'Alene unions.

"I also swear that I will obey all edicts, commands and lawful summons issued by either of the unions, whether I have a personal voice in their enactment or not.

"I do further swear that I will not work underground for any company, corporation or individual in Shoshone County, State of Idaho, for a less compensation than \$3.50 per day, from this day henceforth, so help me God."

The taking of this oath is said to have been followed in the regular ritual by the following "charge" from the presiding officer:

"We all bear witness to your solemn and binding obligation. Keep it at your peril. The man who cannot keep his sacred word of honor sells a noble cause, betrays his fellow members in word and deed in the face of his fellowman and before his God, and is devoid of all principles of manhood, and should be dealt with as a modern Judas. The man who enters our ranks only to reveal the inner workings to persons beyond his jurisdiction does so at his deadly peril and shall suffer the consequences. Furthermore, any member of this union who takes into his confidence, directly or indirectly, any person who has not taken the obligation consistent with the requirements of the Central Union, will be treated as a spy and dealt with as a traitor. Therefore let us join together heart and hand; let secrecy, vigilance and brotherly love be our motto; let us stand by one another like brothers and like men. Our cause is a noble one, and you should feel proud of upholding it. Always bear in mind that—United we stand, divided we fall."

This ritual, I am informed, is, in part at least, copied from that of the Mollie Maguires. How it has been construed and carried out by those who were banded under it, the history of the wrongs committed in its spirit upon free labor, as well as upon the rights of property, abundantly illustrates. Here is an extract, for instance, from one of the handbills circulated by the Cœur d'Alene union:

"STAY AWAY FROM THE MINES.

* * * * *

"Ten thousand determined men are apprised of your coming and will meet you—do not be deceived—he men and assist your fellowmen.

"Workingmen, stand by each other. Be true to your own interests by refusing to take the places of your striking fellow-workmen.

"Workingmen: You are being asked to go to Wallace, Idaho, to work in the mine of Van Delashmutt; you are asked to take the places of honest miners, who are being forced to the wall by foreign capital and Pinkerton thugs; their cause is honest and just. Do not molest them. You will not be allowed to work even when you get there. Ten thousand determined men are on a strike for self-maintenance and have the sympathy of the entire northwest.

"The employment agency who sends you out simply extorts \$2.50 from you. You will be turned loose on a barren waste without friends, without a home and without means whereby to get out of the country. Do not go."

Events proved that this was no empty threat. Nobody for an instant supposed it to be so. The Miners' Union has shown often enough that when it "advises" and "persuades" non-union workers not to work, it "means business." But physical courage in the Northwest is not confined to that body; and there were multitudes of men who wanted work on the terms offered by the mine owners, and were ready to risk their lives to get it.

Thus we are brought back, at the end of this series of articles, to the proposition with which we began. The first imperative duty of society at this time, not only in defense of its own existence, but in the interests of its weakest members, is to deliver workingmen from outright physical oppression exerted in the name of "labor," and encouraged in the name of philanthropy. Further problems can scarcely be examined at all, still less solved, until the outrageous element of pure, selfish violence has been eliminated. And for this end little or nothing is needed but a manly instead of mawkish public sentiment, demanding and supporting a firm administration of equal laws. Let us agree to waste no sympathy upon the sturdy beggar who whines and threatens at once, holding out one hand empty for alms, while the other brandishes a bludgeon. Let us unite in trying liberty and justice a little longer and a little more fairly, before we confess that they have failed.

R. W. R.

CORRESPONDENCE.

We invite correspondence upon matters of interest to the industries of mining and metallurgy. Communications should invariably be accompanied with the name and address of the writer. Initials only will be published when so requested.

All letters should be addressed to the MANAGING EDITOR.

We do not hold ourselves responsible for the opinions expressed by correspondents.

Notes on the Copper Market.

EDITOR ENGINEERING AND MINING JOURNAL:

SIR: The copper market shows increased firmness since last week, both here and abroad, and a strong tendency toward higher prices. In fact, I should not be surprised to see the price of lake and electrolytic copper up to 13c. to 13½c. shortly, with corresponding quotations of casting and Arizona copper here and G. O. B. brands in London. Such prices would leave a small margin to our producers, the majority of whom cannot produce with profit at ruling market quotations, as has been demonstrated repeatedly in the columns of the ENGINEERING AND MINING JOURNAL, particularly in the issues of February 6th and February 20th.

Those views have of late been confirmed by the report of the Boston & Montana Copper Company, published in this issue. This company has been unable to pay any dividends since November 1st, 1891, and there is no reason to suppose that the other Butte companies producing ores, whose yield is partly much lower than that of the Boston & Montana, have attained better results. There can be no doubt that the voluntary reduction of the American output by 6½% is visible on both sides of the Atlantic.

Our home consumption has again increased this year considerably, and I am informed that the consumption of the first 10 months is equal to the whole of that of last year.

Consumers with but a few exceptions carry no stock, and live from hand to mouth. From European statistics we notice a further decrease of stock on hand amounting to 1,600 tons since November 1st. It is also a fact that our exports to Europe have been largely reduced, and even several lots of Lake and Arizona copper had lately to be re-imported to supply our home consumption. It is stated that the Anaconda works close down this week for the next three months, and the upper Butte works of the Boston & Montana permanently. Hence the supply of copper matters will be somewhat cut down for the present.

The production of the United States, as well as that of Europe, has fallen off largely since July 1st. The important Mansfield works in Germany, being troubled by water, have lessened their production.

The balance of lake copper held by Baron Hirsch since the disaster of the French syndicate was sold last week and has gone into consumption.

Electricity is creating a still increasing extraordinary demand for the metal, and yet the present application of electricity is but small in comparison to the uses it will be put to in the future; it is not likely that any other metal can be substituted for copper in the distribution of electrical energy. On the other hand our great producers are able to work at current prices. Using the latest improvements they are mining more low grade ores day by day, which means increase of plants for a given production, consequently a greater investment and higher costs of production. They cannot afford to supply the world continually without earning reasonable interests on their investments in addition to the money necessary to cancel outstanding bonds and other indebtedness.

The natural law of supply and demand must inevitably result in an increase of the price of this metal in the near future.

NEW YORK, Nov. 17, 1892.

S. E. RAUNHEIM.

The Lemhi Gold Placers.

EDITOR ENGINEERING AND MINING JOURNAL:

SIR: We beg of you space for some comments on an article in your issue of October 22nd.

The high bars which form the valuable placer ground of the Lemhi Placer-Mining were discovered, as stated in your article, by W. S. Patterson. Mr. Patterson came to Denver in the late summer of 1891, formed a syndicate for the examination, location and purchase of certain high bar placer ground in Lemhi County, Idaho; the syndicate was composed of the following persons: William P. Bonbright, of Colorado Springs, Oliver B. Shallenberger, of Rochester, Pa., then temporarily residing at Colorado Springs; Henry E. Wood, Geo. J. Boal, L. H. Jackson, James S. Templin and one Harper, all of Denver; W. S. Patterson

being the eighth member. Messrs. Patterson and Templin were sent by the syndicate to make careful examination of the bars and report. Their report was sufficiently favorable to induce further and more careful prospecting, and Messrs. Bonbright, Shallenberger, Templin, Patterson and J. Arthur Connell, of Colorado Springs (who had been admitted to the syndicate by Mr. Bonbright), and Mr. Henry E. Wood, of Denver, a mining man of high reputation, went to Idaho and did such work in prospecting the ground as was possible in a few weeks of time. A purchase of 120 acres for \$20,000 was made by Messrs. Bonbright, Patterson, Wood and Shallenberger—but in the interest of the Syndicate. Claims were located covering about 1,800 acres of high bar ground, which had been prospected with as good results as were secured from the 120 acres purchased. That this is so is demonstrated by the examination subsequently made by Mr. Bowie.

While these gentlemen were still in Idaho, Capt. John L. Armit, of Colorado Springs, learning of possible opportunities, organized a syndicate, went to Salmon City and bought out the interests owned by two members of the syndicate, Messrs. Templin and Harper. All this was prior to the organization of the company. Mr. Templin never had anything to do with the company and never has owned a share of its stock. Upon the return to Colorado of the gentlemen named, and after a report by them of the results of their examination and of their views of values, the company was organized. It is true that the capitalization was fixed at 1,000,000 shares, and that treasury shares were sold at \$1 each, but it is not true that a "rosy prospectus" was immediately issued as a means of enlisting interest in the property.

Mainly on the statements by Messrs. Bonbright, Shellenberger, Connell and Parrish, all of Colorado Springs, their friends bought some 50,000 shares of the treasury stock. It was not until February, 1892, that the prospectus was issued, at which time 67,632 shares of treasury stock had been sold. Subsequently 16,332 additional shares were sold, of which 13,500 shares were sold to mining men in Denver and Colorado Springs, of long and large experience, including Dennis Sullivan, David M. Hyman and J. J. Hagerman. As stated above, Templin never owned, and neither he nor Patterson had ever sold a share of stock prior to Oct. 29., and Messrs. Wood, Boal and Jackson, instead of attempting to deceive the public, have, with undiminished faith in the value of the property, retained to this day almost their entire stock. That many shares of this stock have changed hands there is no doubt, but the sales have, in the main, been made by owners and stock operators at Colorado Springs.

It is stated that the new management "commenced well by employing the eminent expert A. J. Bowie to examine and report on the property." Mr. Bowie was in fact employed by the old management, and his report, made under the old management, at the annual meeting was so favorable as to induce Messrs. Hagerman, Hyman and Grant to furnish \$125,000 cash in furtherance of the plan of re-organization.

We venture the prediction that the future of these properties, under the direction of Mr. Aug. J. Bowie as Consulting Engineer, will fully realize the hopes and expectations of stockholders.

BOAL & JACKSON.

DENVER, Nov. 4, 1892.

An Old Australian Miner's Table of Measures.—In his "Pocket-Book for Miners and Metallurgists," Mr. Danvers Power, of Melbourne, puts on record the old digger's table of measures which was used in the mining districts of Australia where no ordinary legal weights and measures were to be found. This table is as follows: "One dish = 573 cub. in. = one 2-gallon bucket; two 2-gallon buckets = 1 nail-can; 4 nail-cans = 1 tub; 2 tubs = 1 porter cask; 10 tubs = 1 load; 1 load = not quite one cubic yard of loose gravel; 120 dishes = 1 cub. yd. *in situ*."

American Nickel-Steel Plates in Russia.—An official trial of the nickel-steel Harveyized American armor-plate was to have been made on the 15th inst. on the Russian proving ground at Okhla, in competition with a French nickel-steel armor-plate made at the Creusot Works. The plate is the same in dimensions as that used in the successful test by the British Admiralty, at Portsmouth, England, on November 1st, namely: 10½ in. thick, 8 ft. high, and 6 ft. wide. This test is to be made with a view of adopting the American plate for Russian battleships, if it is satisfactory.

Missouri Geological Survey.—During the month of October the work of the Survey has been carried on as follows:

In the field, examinations of lead deposits and general stratigraphic studies have been prosecuted in St. Francois, Ste. Genevieve and Perry counties; in addition, detailed mapping has been done in Washington and St. Francois counties, covering about 100 square miles. This latter work is largely in the Flat River district of the latter county. This district has been the center of much activity during the past year; much drilling, shaft sinking and other prospecting has been undertaken here, and bodies of lead ore have been discovered at several different localities. The work started by the Survey in this district will be of great assistance in promoting the development of these ores.

The examination of the clay deposits has been prosecuted in over forty counties of the State, and special examinations have been made in Grundy, Marion, St. Louis, Jefferson, Caldwell, Linn, Shelby, Monroe, Atchison, Nodaway, Gentry, Sullivan, Andrew, Holt, Cape Girardeau, Wayne and Reynolds counties.

In the office and laboratory the usual work has proceeded, including the preparation of reports on the crystalline rocks, on the paleontology of the State, on the Iron Mountain sheet and on the metallurgy of lead; also complete analyses of twelve different samples of clays have been made.

The printing of the Iron Ore Report has progressed, and the larger part of this report is now in the hands of the printer. The first part of the Report on the Mineral Waters of the State has also been sent to the printer.

The engraving of the Iron Mountain Sheet and the Bevier Sheet in Macon County is well under way and proofs are expected soon.

In addition to this regular work, much has been done by the Geological Survey in co-operation with the Missouri World's Commission, toward the preparation of the mineral exhibit to be displayed at Chicago next year. Missouri has been assigned by Mr. F. J. V. Skiff, Chief of the Department of Mines and Mining, one of the most prominent locations in the Mines and Mining Building.

THE LIDGERWOOD RAPID UNLOADER

The Lidgerwood Manufacturing Company of this city are introducing a new device for rapidly unloading ballast, earth, etc., from flat cars. It is really a substitute for a train of tipping cars. A train is made up of flat cars, such as are shown in Fig. 1. The cars are connected one with another by steel aprons so that the whole of the top surface of the cars is continuous. On the first car is a Lidgerwood hoisting engine (Fig. 4), which is supplied with steam from the locomotive in front. When the cars are all loaded, as in Fig. 3, the steel cable from the winding engine is attached to a plow at the far end of the cars. The winding in of the cable draws the plow along to the front, and the earth, ballast, etc., are thrown off on one side as shown in Fig. 2. By this method the line of cars is cleared in a very short time and with much less labor than is required in connection with tipping cars. Fig. 1 shows the plow at the end of its journey and Fig. 3 shows it at the beginning. It will be seen that if the locomotive is stationary, the material will be delivered along the side of the rails; but if the locomotive moves the train back as fast as the cable is drawn in, the material will be delivered all in one heap, while if the locomotive draws the train in the same direction of the plow, the delivery of the material will be in a more attenuated line. The "Rapid Unloader" has been tested for some time on the Delaware & Hudson Canal Com-

BELMONT MAGNETIC IRON ORE.

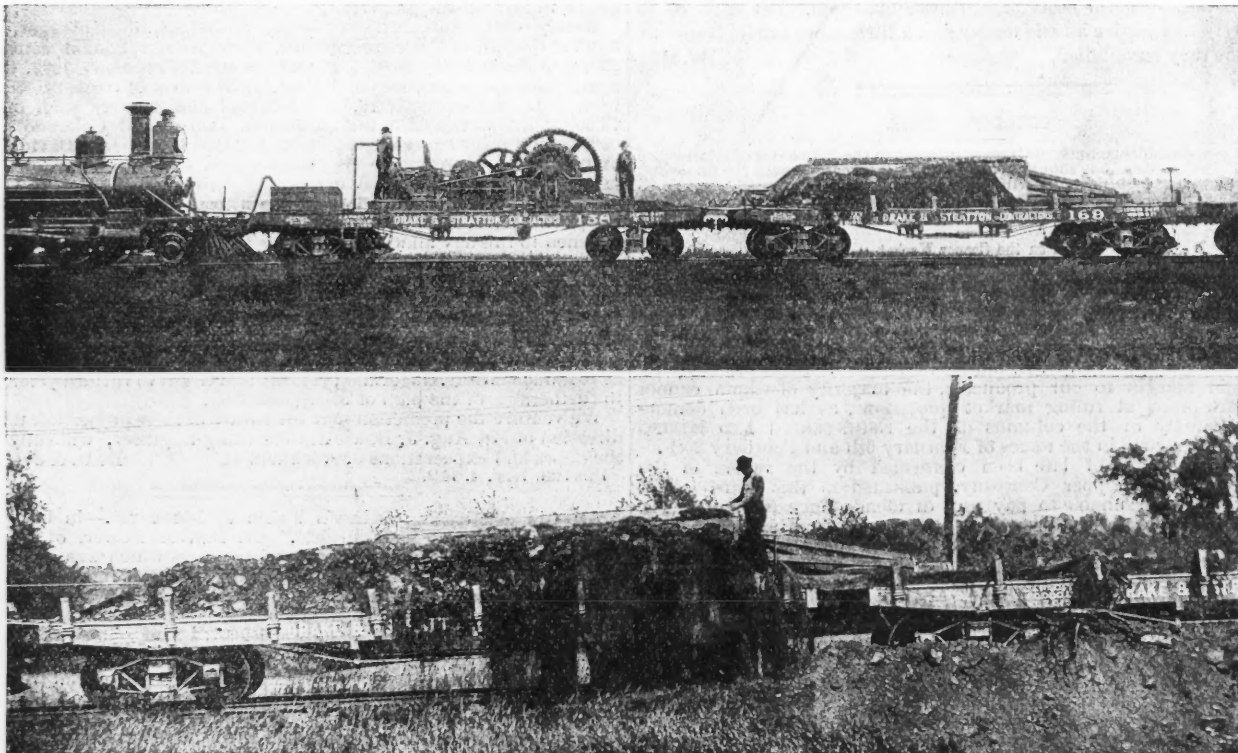
Written for the Mining and Engineering Journal by Wm. Molin.

The following analysis represents a large deposit of magnetic iron ore located about 160 miles east of Toronto, and but a few miles from the Canadian Pacific Railway:

Metallic iron.....	65.10%	Manganese.....	nil
Silica.....	3.83%	Copper.....	nil
Alumina.....	2.35%	Titanic acid.....	0.04%
Lime.....	2.93%	Phosphorus.....	0.005%
Magnesia.....	0.63%	Sulphur.....	0.07%

* Some samples have assayed as high as 70%.

A couple of years ago the property was bought by the Belmont Bessemer Ore Company, Limited, 29 Broadway, who are now connecting it with the Canadian Pacific by building a railway, after the completion of which shipments will begin. It has been estimated that this ore bed contains over 1,000,000 tons of ore within 100 ft. of the surface, and the stripping is very light. The ore bed has been thoroughly explored, and of the numerous samples which I have analyzed the above example is a fair average. It will be noticed that this ore equals the best of the famous Swedish Dannemora ore in regard to its low phosphorus contents, contains much less sulphur, and from 10 to 20% more iron. Like the Dannemora ores the Belmont ore varies a trifle in phosphorus, which element, however, in no instance has been found to exceed the limit allowed in



THE LIDGERWOOD RAPID UNLOADER.—FIGS. 1 AND 2.

pany's railroad. It was found that a round trip from the loading place to the tipping point a mile away and back again only occupied twenty minutes.

Onyx Mining in Mexico.—The quarries for the most part are situated within a radius of from 25 to 40 miles of the city of Puebla, and the finer sorts of the onyx are in that city worked up into ornaments of various kinds and of exceeding beauty. Some eleven or twelve establishments in Puebla are now sedely engaged in manufacturing these ornaments.

Being desirous of personally inspecting some onyx quarries a correspondent of the "Mexican Trader" recently visited the Tepeaca quarries. The onyx used in the Auditorium of Chicago was taken from these quarries; the stone took a prize at the late Paris Exhibition. The distance from Tepeaca to the nearest quarry is about three miles, but the onyx is found in, perhaps, upwards of a score of places on a hill named Santiago Acatlan, some ten miles in length. The color of the stone ranges from pure white to practically black. Rose color specimens, which we picked up, seemed to be the most valuable kind, but all appeared good, while the quantity in sight is great.

Quarrying for onyx is proceeded with in the ordinary way by means of blasting. From the time-sheets presented by the administrator of the quarries, we ascertained the following particulars as to the wages paid for quarrying. The quarrymen get 75 cents per cubic foot raised and roughly cubed, while the peons are paid 37 cents per day. The blocks of onyx are sawn in the shops and are polished on stone, acids being afterward employed to complete the process. Prices vary very much, according to the color of the stone. Some specimens realize as much as \$18 a cubic foot. Good onyx will fetch in New York about \$40 a ton. The cost of freight from Puebla to New York is about \$12 a ton, but the cost depends somewhat upon the size of the blocks. To illustrate this we may mention that the Ward Steamship Line quotes as under for freights of onyx from Vera Cruz to New York. For blocks weighing less than two tons, \$6 per ton; from two to three tons, \$10; from three to four tons, \$15; from four to five tons, \$20. The difficulty in handling large blocks, is, of course, the cause of the freightage of large blocks being higher than that of small ones.

ores for the manufacture of materials for remelting in crucible for the manufacture of the highest grades of crucible tool steels.

It is well known by those familiar with the manufacture of crucible tool steels that the highest grades can be made only by remelting Swedish bars, especially those made from Dannemora ores, the superiority of which irons depends on their freedom from impurities, method of manufacture and the nature of ores used in their production. And when it is also remembered that these ores are magnetic, the inference may be drawn that the best way to make such an ore deposit as the Belmont most profitable to the owners would be to adopt the Swedish method and engage in the manufacture of bars for the crucible steel trade. If the raw materials (the ores) can be found there is no reason why this continent should not supply existing needs. Some manufacturers of tool steels, especially in the eastern part of the country, seem to have an idea that they can compete with Pittsburg manufacturers only by producing cheap, *i. e.*, inferior tool steels, which often are nothing but rerolled open-hearth products. It is a fact, however, that superior steel always fetches a good price. And nobody knows this better than the tool maker who insists on having English steel, because he is sure that it is made from Swedish bar, which is the product of magnetic ores.

The Price of Naxos Emery Stone.—The Greek government has reduced the price of emery stone mined on the island of Naxos to 100 francs per metric ton or if in large quantities at 65 francs. This stone sells in America at about 22 cents a pound.

The Panama Canal.—A cablegram from Paris states that the Republic of Colombia has extended the time of the Panama Canal concession for one year, and the *Figaro* urges the French Government to abandon the idea of prosecuting the directors of the canal company. M. Hielard is now placed in a better position to raise the 160,000,000 francs estimated as necessary for the completion of the canal, as doubtless a still further extension of time can be obtained if the Colombian Government should be convinced that an earnest effort is to be made toward continuance of the work. M. Ricard has informed the Cabinet that the directors of the Panama Canal Company and the contractors who were engaged in the work are to be prosecuted. It is believed that De Lesseps, Baron Cottu, Marius Fontanes and M. Eiffel are included in the indictment.

THE ELIMINATION OF SULPHUR FROM IRON.

By J. E. Stead, Middlesborough, Eng.

(Continued from page 460.)

Percy has shown that by heating sulphide of iron with peroxide of iron in a clay-crucible, the oxygen, over and above what is required to convert all the iron into magnetic oxide, oxidizes the sulphur which escapes as sulphurous acid. $FeS+10 Fe^2O^3=7 Fe^3O^4+SO^2$. As this result was obtained by melting the mixture in a clay-crucible, it is probable that the oxide would form silicates with the material of which the crucible was made, and is therefore open to objection.

In another experiment made in Percy's laboratory, it would appear that if an excess of sulphide is added, a homogeneous mass, consisting of iron silicate and sulphide of iron dissolved in it, was obtained. The analysis, unfortunately, was not given. Finkener melted sulphide of iron in a platinum boat in a tube exhausted of air; "the mixture was completely melted, the platinum boat eaten through, and the tube fused." Wedding says "that sulphide of iron in association with magnetic oxide is stable."*

The most conclusive evidence as to the stability of mixtures of oxides and sulphides of iron was obtained during trials which were made in working the Hollway process of blowing air through fluid sulphide of iron containing some copper, in presence of sand or silica. When the silica was deficient in quantity, a slag of the following approximate composition was obtained, which was quite homogeneous:—Iron, 64.11; sulphur, 15.82; silica, 4.65; oxygen, &c., by difference, 15.42 per cent.; total, 100.00.

Analysis of the ordinary slag, consisting (when almost fully saturated with silica) essentially of protosilicate of iron, contained, dissolved and evidently combined in the mass, sulphide of iron equal to from 3 to 5 per cent. of sulphur. When, however, this slag was oxidized so as

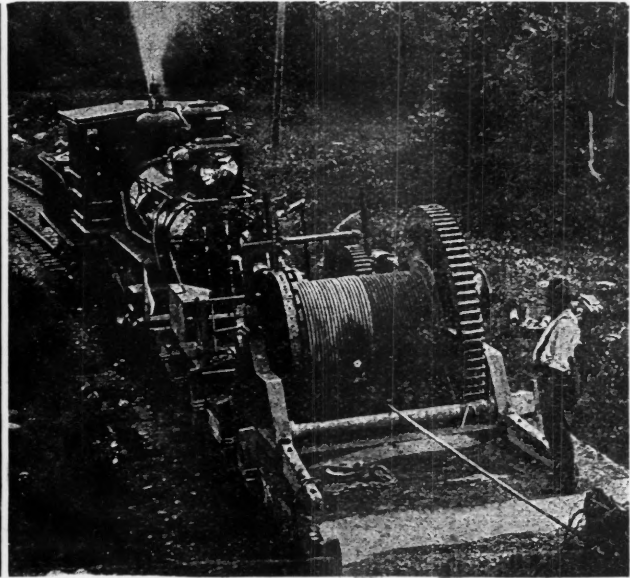
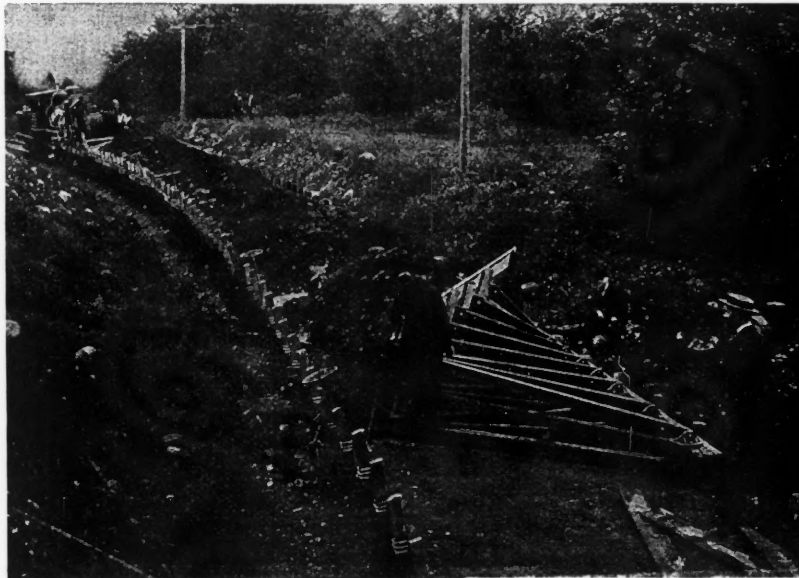
In accepting the second hypothesis, we must assume either that the whole of the sulphurous acid escapes (in which case no sulphur would be retained in the slag), or that it partly suffers reduction after it leaves the iron, and by some unexplainable reaction it again combines with iron, forms sulphide, and dissolves or combines with the basic silicates.

An endeavor to ascertain the nature of these changes was made in my laboratory, but it was soon found that on a small scale it was almost impossible in a crucible experiment with ordinary fluid cast-iron and cinder to obtain satisfactory results, as the iron so rapidly begins to boil, and then sets into solid particles. A compound of the following composition was therefore prepared, containing no silicon or carbon, but sufficient phosphorus to keep the mass fluid at a comparatively low temperature:—Sulpho-phosphide of iron—Iron, 90.70; phosphorus, 7.10; sulphur, 1.86 per cent. A basic silicate of iron made by melting together steel scale from a "rod mill" and sand in a clay crucible, was also prepared.

A small quantity of the phosphide was shaken, when liquid, with the fluid cinder in a crucible, which was removed from the fire just before the experiment was made. During the agitation apparently no gas was given off, and no odor of sulphurous acid could be detected. After shaking for about one minute, the still fluid contents of the crucible were poured into a mold, and, when quite cold, both the cinder and iron were analysed. The quantity of the cinder was greatly in excess of the sulpho-phosphide. The analyses were as follows:

	Cinder.		Metal.	
	Before. Per cent.	After. Per cent.	Before. Per cent.	After. Per cent.
Sulphur	0.06	0.27	1.86	0.27

Judging from this imperfect experiment, it would appear that no perceptible amount of SO² was evolved, although a considerable amount



FIGS. 3 AND 4.—THE LIDGERWOOD RAPID UNLOADER.

to produce a considerable quantity of peroxide of iron, the whole of the sulphur passed off, most probably as sulphurous acid.

Slags Produced in Working Hollway's Process.

	Protosilicate. Per cent.	Protosilicate. oxidized. Per cent.
Silica.....	30.05	34.34
Iron protoxide.....	54.62	25.10
Iron peroxide.....	3.71	33.83
Manganese protoxide.....	4.27	—
Iron.....	0.37	0.12
Alumina.....	2.06	1.81
Zinc oxide.....	1.75	0.73
Copper oxide.....	0.22	2.39
Lead oxide.....	0.10	0.03
Lime.....	0.37	0.24
Magnesia.....	0.45	0.30
Sulphur.....	2.55	0.15
Arsenic.....	Trace	None
Phosphoric acid.....	—	0.031
Oxygen, &c., not estimated.....	—	1.45

The fact that basic silicates of iron can dissolve sulphide of iron is evident also from the analyses of the puddling and analogous slags, nearly all of which show the presence of the sulphide in amounts varying from 0.24 per cent. to 3 per cent. It has been proved by Parry, Snelus and myself, and others, that in purification with basic silicates of iron, some of the original sulphur remains in the slag as sulphide of iron, and some of it passes away as sulphurous acid gas.

Taking all these facts into consideration, it would seem that there can be only two possible explanations to account for the removal of sulphur from the fluid iron by molten iron silicates:—1st. That the attraction of the cinder for iron sulphide is greater than that of the iron, and that it is simply washed out of the iron and in part retained in the slag, the other part, after removal as sulphide, being oxidized to sulphurous acid by the free oxygen always present in the hearth of the puddling furnace, or by the water-vapor from the coal. 2d. That the peroxide of iron in the cinder acts directly on the sulphur in the iron, oxidizing it to SO².

* Wedding, "Basic Bessemer Process," p. 191.

of sulphur was removed from the metal. The existence of sulphur in the slag, which, previously to bringing it in contact with the metal, was in very small proportion, would rather favor the theory that sulphide of iron is actually washed out of the metal, and not oxidized directly. This question is receiving more attention, and I hope before long to have more reliable and conclusive results to place before you.

IV.—SULPHUR IN ACID STEELMAKING PROCESSES.

Wedding, in his work on "The Basic Bessemer Process," page 143, says: "It is well known that in the acid Bessemer process sulphur is evolved in considerable quantity, as sulphurous acid, because iron sulphide, silica and carbon change into carbon-silicon iron and sulphurous acid. In this way from 92.8 per cent. to 97.5 per cent. of sulphur can be removed." Sir I. L. Bell, in his "Principles of Manufacture of Iron and Steel," page 423, gives analyses of the changes which occur in this process, indicating practically little or no sulphur elimination, and I believe that this conclusion has been arrived at by other careful observers. At the various works where I have had the opportunity of testing the metal before and after blowing in the converter, it has always been shown that there was not less quantity in the steel.

When the metal is melted in a cupola-furnace, preparatory to blowing it, sulphur is absorbed from the fuel to the extent of from 0.01 to 0.06%, the quantity depending on the amount and quality of the coke, and, to a certain extent, on the proportion of limestone used as a flux, and it is a fact that in ordinary English practice, when working in this way, the sulphur is higher in the steel than it is in the original metal. Howe says that White, of the Bethlehem Steel Works, America, found more sulphur in the steel than was in the metal run into the converter, no doubt the result of concentration and absence of any elimination.

Sir L. Bell, in blowing Cleveland iron at Spennymoor, found no elimination of sulphur. Snelus at Dowlais, in working pig with 0.014%, found only a trace in the steel. As, however, there was practically only a trace to commence with, the conditions can scarcely be taken as suitable for ascertaining the behavior of the sulphur in metal blown in a converter. Baker at Sheffield found that the metal charged, containing 0.107%, was reduced to 0.093% at the termination of the blow. At Seraing, metal containing 3.75% Mn. and 0.04% sulphur suffered no diminution of sulphur

during conversion in the Bessemer converter. If we take into consideration the concentration occasioned by the combustion of some of the constituents of the metal, it would appear that although the sulphur remains the same in relation to the mass of metal and steel there must be an elimination equal to loss of metal in blowing, and this amounts to about 10 to 11%. This loss may be accounted for by the effect of manganese in the metal, either naturally present or added with the spiegel and ferro.

With regard to the theory that silica oxidizes the sulphur during the first part of the blow, I am afraid we must abandon it, first, because in reality there never is free silica present when the silicon is oxidized, for it is well known that the magnetic or other oxides at first produced near the tuyeres are the main agents at work in removing silicon, and this they do at their own expense, as they are partially reduced iron and silicate of iron, and not free silica resulting; and second, for reasons previously advanced, even if free silica were present the temperature at the early stage of the blow is not sufficiently high or the time of exposure long enough to be at all comparable with the conditions of the experiments made in Dr. Percy's laboratory.

V.—SULPHUR IN THE OPEN-HEARTH ACID PROCESS.

Snelus, Hardisty, and many other observers have noticed that, in the acid open-hearth furnace, there is no elimination of sulphur, but that sulphur is actually absorbed from the furnace gases, and thereby materially increased in the steel. My experience is that, in working with the purest material, containing only 0.01% sulphur, the steel contains from 0.025% to 0.040% sulphur. Not only is sulphur absorbed from the sulphurous acid in the furnace gases, for, if it is present in the ore charged to oxidize the bath, a portion at least will pass into the steel; it is necessary, therefore, to use ore free from sulphur for this purpose. Willis found that 30% of the sulphur in ore containing sulphate of baryta passed into the steel. The silicious slag always present in contact with the bath of metal approximates closely to what is first produced in burning the silicon in a Bessemer converter, and that it has no action whatever on the sulphur in the metal demolishes completely the theory that it has any effect in that direction in the converter.

Sulphur in the Basic Processes.—Herr Massenez and Professor Finkener in Germany, and nearly all observers in this and other countries, are agreed, as indicated by the analyses they have published, that there is a notable quantity of sulphur removed in the basic Bessemer converter. Professor Finkener found that in blowing metal containing 0.08% and 1.0% manganese, in 2½ minutes it was reduced to 0.047%, after which it steadily increased till it amounted to 0.055% at the end of the blow; but after the addition of spiegel and ferromanganese, it fell to 0.045%. At Hörde, in blowing iron containing 0.42% sulphur, and only 0.41% manganese, the sulphur was not apparently reduced till the after-blow was half completed, when it was reduced to 0.26%, and to 0.15% after the addition of spiegel and ferromanganese. At Eston, when ordinary Cleveland iron was blown, I found that where only 0.05% sulphur was originally present, it remained constant, but that in blowing metal with 0.16% sulphur it was steadily eliminated till it reached 0.10%.

Kupelwieser found that in blowing metal at Hörde, the sulphur increased as the conversion progressed from 0.152% to 0.206%, but that it diminished to 0.133% after adding the spiegeleisen and ferro-manganese. At Witkowitz he found the same amount of sulphur in the steel as was present in the pig. Wedding states that at Creusot, by continuing the blow after the phosphorus is removed, the sulphur in the pig is reduced from 0.2% to 0.03%. Mr. C. H. Ridsdale informs me that, after long experience, he has found that at the Northeastern Steel works the sulphur on an average is diminished by about 0.03% from metal containing about 0.09%, the initial amount of manganese being about 1%. Sir L. Bell gives analyses made in his laboratory of the results obtained by blowing white iron at Hörde, which show an elimination of 73% of the sulphur present. This, however, must be taken as exceptional.

On examining all these results, excepting those of Kupelwieser, we find that when the proportion of sulphur is considerable, the amount eliminated is much greater than when presented in less amount, thus, without taking into account concentration by loss in blowing:—With 0.42% in the pig, the steel contains 0.15%, or 64% less. With 0.307% in the pig, the steel contains 0.85%, or 73% less. With 0.160% in the pig, the steel contains 0.10%, or 37% less. With 0.09% in the pig, the steel contains 0.06%, or 33% less. With 0.05% in the pig the steel contains 0.05%, or no change. Allowing, however, for the loss in blowing, the proportions given above must be increased by about 15%, more or less.

Wedding* says the fact that manganese addition at the termination of the blow caused a diminution of sulphur need not create surprise, "since it is well known that the manganese induces a removal of sulphur." Also, "That S actually volatilises from the vessel is indicated by the fact that the slags from highly sulphurous charges contain no proportional increase of CaS, so that the elimination of S from the metal exceeds what is thus accounted for in the slag."

Sulphur in the Basic-hearth Process.—Mr. Harbord in his paper on the basic-hearth process, to this institute, shows that in working charges containing high sulphur, the amount eliminated varies between 45% and 50%:

	Metal containing Per cent.	Steel containing Per cent.	Removed Per cent.
Sulphur.....	0.23	0.125	45
Sulphur.....	0.18	0.089	50
Sulphur.....	0.40	0.200	50

Mr. Hardisty has kindly given me the following information obtained as the result of his experience:

	Metal containing Per cent.	Steel containing Per cent.	Eliminated Per cent.
Sulphur.....	0.22	0.15	31
Sulphur.....	0.15	0.11	26
Sulphur.....	0.10	0.065	34
Sulphur.....	0.07	0.050	30
Sulphur.....	0.04	0.025	37
Sulphur.....	0.025	0.015	40
Average			33

Yet Wedding says: "It is to be noted that the basic open-hearth process removes little or no S, so that its product averages relatively more

* *Journal Iron and Steel Institute*, 1890, vol. ii., p. 539. *Vide Iron* of December 12th, 1890, p. 517.

sulphur than does converter metal." Wedding also gives results, showing that near the end of the process, the S increases in the case quoted from 0.067% to 0.087%. He also says, "apparently open-hearth metal is less affected in its physical qualities by S than converter metal." Mr. Saniter's experience at Wigan confirms Dr. Wedding, and as no elimination is the normal condition, Messrs. Harbord and Hardisty's results must be considered to be exceptional.

In discussing the changes which occur in the basic Bessemer process, Professor Finkener states "that it is impossible to remove sulphate of lime, for that body is reduced by iron, sulphide and oxide of iron and lime resulting, and that other sulphur compounds, when they are formed, are decomposed by iron." Wedding says: "If the action of sulphur in the blast furnace can be compared to its action in the acid and basic Bessemer process, it follows that a sulphur separation can take place with calcium and manganese, because the oxidizing effect of the oxygen fails; in the acid process the oxidizing effect of the oxygen adds to that of the free silica, while in the basic process these two conditions fail, and therefore a low sulphur-content conditions a favorable result." Later, however, Wedding says, "that in converting basic iron in a converter, the sulphur is not reduced till the after-blow;" he says, "many special investigations have proved that during the dephosphorization manganese returns to the metal bath, where it effects an elimination of sulphur."

Now, with all these facts before us, and the theories of Wedding and Finkener to guide us, and the fact that lime alone, and calcareous slags are capable of removing sulphur from iron, it would seem that what desulphurization is effected, results from one or a combination of four causes.

1. That the manganese, added in the metal, in passing out may carry some sulphur with it.
2. That the manganese, reduced from the slag, during dephosphorization, effects an elimination of sulphur.
3. That the calcareous slag in contact with the upper surface of the bath containing carbon may absorb sulphur.
4. That some of the manganese added in the ferro does undoubtedly leave the bath again, carrying with it a small quantity of sulphur.

The changes during elimination of the sulphur in the basic process, however, have not yet been thoroughly explained, and the subject is worthy of more attention.

Rollett has made many and exhaustive experiments to desulphurise iron. His process consists "in melting pig iron and maintaining it at a very high temperature under the double action, slightly reducing and slightly oxidizing, in the presence of a slag obtained by admixtures of limestone or lime, iron ores, and fluor-spar, in proportions depending on the quality of the pig or castings employed." He says, "the elimination of the sulphur is complete up to 99%, and even more." The process is conducted in a jacketed or basic-lined cupola furnace, and coke is used as a fuel, a large excess of lime and from 2 to 4% of fluor-spar is used, so that the slag does not contain more than 2% silica. I have not had an opportunity of investigating this process, and cannot therefore explain why it is that the sulphur passes out of the slag. As, however, both Mr. Saniter and I have found that lime alone will desulphurize iron, it is probable that the very calcareous slag employed is in greatest measure responsible for the elimination.

(To be continued.)

Patent Laws of Austria.—In a recent consular report, Mr. Goldschmidt, American Consul-General at Vienna, says that many American inventors fail to derive any benefit from the use of their inventions in European countries simply through their neglect to take out the necessary patents. For this failure to patent he gives three causes: 1st. The patent law of all continental countries provides that the invention must be worked within a certain short time; 2d. Want of proper connections in Europe for placing the patent; and 3d. The excessively high prices charged in America for procuring the patent. To this we would add the general ignorance on the part of the American inventor of foreign patent law. Of the patent law of Austria-Hungary Mr. Goldschmidt gives the following resumé: Patentable in Austria-Hungary are (1) new products of industry, (2) new means of production, (3) new methods of production. A patent cannot be obtained for: (1) scientific principles; (2) the preparation of articles of food, beverages and medicines; (3) inventions the practice of which is against the existing laws. There is no examination as to the novelty of the invention, the only conditions being that the invention be described (and shown) with sufficient clearness to enable a person skilled in the respective art to carry it into practice; that the first annuity be paid; that the two copies of specification and drawings are exactly alike, and that all the pieces be properly stamped.

The patent is granted at the exclusive risk and responsibility of the applicant. When two or more applications are filed for the same invention, all patents will be granted, but only that granted upon the first application will be valid. A patent will expire: (1) With the expiration of a foreign patent granted previously for the same invention; (2) if it is found that the specification is not sufficiently clear; (3) if anybody produces legal proof that the invention patented was not new at the time of the application; that is, that it was in use in Austria-Hungary, or known through a printed publication, or that the invention had been imported from abroad, and the Austrian patent had not been granted to the rightful owner of the previously obtained foreign patent or to his legal representatives (assignees); (4) if the owner of a patent in force shows that the invention of the later patent is identical with that of his own; (5) if the owner of the patent has not at the latest within one year after the day of issuing of the patent document commenced to work his invention in Austria-Hungary, or if he has entirely interrupted this working during any two subsequent years. The following is given as the cost of obtaining the patent: First year's annuity, 26.25 florins (\$11); cost of stamps, 5 florins on an average (\$2); total cost of patent of 15 years including one annuity, \$13. For this patent the inventor pays in the United States \$100. These figures compare well with the cost in other European countries; thus the actual cost of a German patent, including the first year's annuity, amounts to 50 marks, or \$12.50. The actual cost of a Belgian patent, including the first year's annuity, amounts so only \$2.00.

WINGHAM'S SLIDE RULE FOR CALCULATING BLAST FURNACE CHARGES.

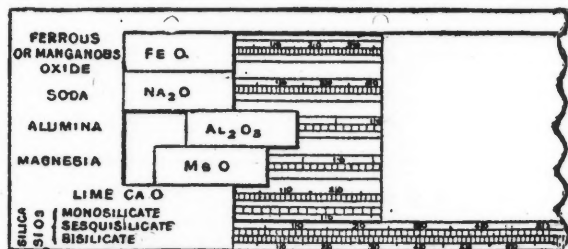
As we mentioned in our report of the summer meeting of the Iron and Steel Institute, Mr. A. Wingham, one of the assistants at the British Mint, has brought out a slide rule for calculating blast furnace charges. An instrument of this sort will save an immense amount of labor in all manner of calculations connected with blast furnace practice, and its use should become widespread. The illustration which we give herewith shows one end of the rule. The best way to describe the rule is to give an instance of its use. Suppose that it is desired to ascertain the nature and quantity of a flux to form a neutral slag with 100 tons of ore of the following composition: Iron, 40.5%; lime, 6.5%; magnesia, 4.2%; alumina, 10.4%; silica, 18.2%. The large or main slide is first withdrawn until the figure 6.5 on the line scale is just disclosed. After this the magnesia slide is pushed out up to the end of the main slide. The main slide is then withdrawn until the figure 4.2 on the magnesia scale is reached. Then the alumina slide is pushed up to the end of the main slide, and the main slide is withdrawn further, until the figure 10.4 on the alumina scale is disclosed. Then the silica (monosilicate) scale is read off. The figures thus obtained 15.7 is the amount of silica which will be neutralized by the three bases present in the gangue. The amount of silica in excess is therefore $18.2 - 15.7 = 2.5$. All the slides are then closed and the main slide withdrawn until the figure 2.5 on the monosilicate scale is disclosed. The figure thus indicated 4.7 on the lime scale is the amount of lime required to neutralize the extra silica and thus to form a neutral slag with the gangue. On turning to the reverse side of the rule, a scale is found which gives the figure 8.4 as the percentage of limestone corresponding to 4.7% of lime. The applications of the rule are various. For instance it is possible to ascertain from the analysis of a slag whether or no the correct quantity of lime is being used. Scales are also arranged on the reverse side for ascertaining the amount of limestone required to combine with the sulphur in the coke.

THE SHAW MINE, ELDORADO COUNTY, CALIFORNIA.

Written for the Engineering and Mining Journal by G. A. Aaron.

My visit to this very interesting property in Eldorado County, California, was one of pleasure, not business, and what I have to say about it must be regarded as expressing only the impression produced by a casual inspection and by information received from the superintendent, Mr. D. W. C. Morgan, and others. The mine is about two miles, by the road, from the town of El Dorado, better known as Mud Springs, and four miles west of the "mother lode." A mile and a half further west is the serpentine belt. The country is slate of various shades from black to light brown, standing nearly vertically as to the sheets and those nearly parallel with the lode; the slate is of the same character on both sides of the fissure.

The deposit has been described as "a porphyry dike with a quartz vein



WINGHAM'S SLIDE RULE FOR CALCULATING BLAST FURNACE CHARGES.

on each side," and, while this may not be strictly accurate, it conveys a good idea as to appearances. Certainly I should not call it a vein, and dike seems quite appropriate. It is of great width so far as traced, over a mile in length; at one point, near the mill, it is over 130 ft. from wall to wall. There is no proper gauge, or selvage, though the filling is quite distinct from the slate which only intrudes to a slight extent in places.

Whether the main mass of the lode can be correctly called porphyry or not can, I think, only be determined by microscopic examination; it may be a porphyritic quartz having feldspar as a constituent, and what I take to be a feldspar also occurs in masses, some of it of a greenish tint. The characteristic material of the lode is a heavy, hard, highly silicious, dark gray rock with sub-conchoidal fracture, seamed more or less with white quartz and impregnated with pyrites of which there are two classes, the one hard, bronze, colored, cubical, striated, and not very rich in gold, the other softer and brass-yellow, not obviously cubical; this latter kind is rich, and I think there are some tellurets among them. Arsenical pyrites also occur.

The gray rock passes gradually, to great extent, into white quartz at the sides of the lode, and where white quartz is found metallic gold also occurs, frequently in considerable masses and sheets, sometimes in lumps of many ounces weight. A curious, though not unique, feature is, that the best pay and the coarsest gold has been found at those points where the walls are curved, which occurs in many places, though the general course of the lode remains constant. This is, or has been, a "poor man's mine," though also affording an opportunity for very large operations, and it has been worked in dozens of shallow shafts and drifts, along the sides, by "pocket-hunters," many of whom have been richly rewarded for their labor. I learn that fully \$200,000 of gold has thus been taken out, in great part by the aid of hand mortars. The feldspar is auriferous where it is permeated by seams of quartz, and the gray rock gives good assays, and also shows coarse gold, even where no white quartz is visible. The lode has not been cut across at any considerable depth, but coarse gold and pyrites have been found at a distance of ten feet from the east wall in the body of the deposit; also, at another point further south fine gold and the rich yellow pyrites were found, and may still be seen, 13 ft. from the wall. The greatest depth yet attained is 135 ft. on the east wall, and good rock is found at that depth.

On the west wall is a shaft about 60 ft. deep, in good pay rock, as are also the drifts north and south from it. Again, good milling rock, not rich enough for the pocket miners, was found some years ago in a shaft in the middle of the lode, so that there is good reason to think that the entire width will pay for exploitation.

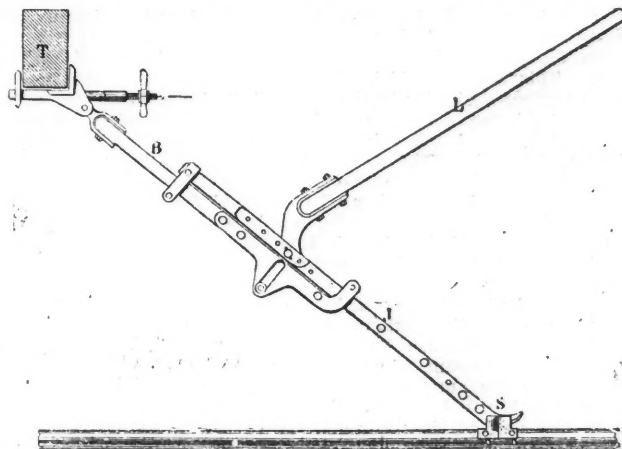
The lode can be cut at a depth of about 140 ft. by a tunnel about 300 ft. long, and if, as seems probable, the pay rock should extend to a width of 10 ft. from each wall, on the average, with a length of 1,000 ft., but little calculation is required to show that 100 stamps could be kept at work for several years without going deeper; while, if the entire width of the lode should prove to consist largely of pay rock, the value of the mine would be enormous. It is certain that rich pay has been found throughout a length of over 2,000 ft. along the east wall, and 600 ft. on the west, in the shallow works of the pocket miners.

About 5,000 tons of ore have been milled by the present company, called the Indian Creek Land and Mining Co., with satisfactory results. The plant at present consists of hoisting and pumping works, a five-foot Huntington mill and two Woodbury concentrators, all steam driven by two engines, but water power can be had by piping the water a few miles. The machinery is all well and substantially housed and in first class condition; the boarding house and lodgings for workmen and for guests are excellent.

I am very favorably impressed by this property, and think that, in strong hands, it would prove to be one of the best in California; it is also a very interesting study for both the miner and the geologist.

A FRENCH CAR STARTER.

We here illustrate the St. Martin car starter, which is used on the Chemins de Fer de l'Ouest, of France. The apparatus consists of two limbs, B and J, which slide one within the other, a lever, L, a shoe, S, which rests on the rail and affords a fixed point of support for the apparatus, and a jointed adjustable socket, which can be clamped on any part of the hind beam T of the car. In using the apparatus the socket is fastened in position, and the shoe S placed in a suitable position on the rail. Then the lever L is depressed, and the limb B is forced out and out. The car is thus started and moved through a certain distance. If further motion is required the lever is raised up, and the shoe S drawn toward the



A FRENCH CAR STARTER.

car, and then the depression of the lever L will push the car along again. The whole apparatus only weighs 16-17 kilogrammes, so that it can be easily carried about. This description and the illustration is taken from *Le Genie Civil*.

Use of Mild Steel in Construction.—At the beginning of this year the Aachen section of the *Bezirksvereines Deutscher Ingenieure* appointed a commission to examine and report upon the subject of ingot iron (Flusseisen) as used in construction, and more particularly in regard to its extended use consequent upon recently improved processes of its manufacture. The report of the committee can be found in detail in the *Zeitschrift des Vereines Deutscher Ingenieure*, Band cxxxvi., No. 10. In the report the committee state that they thought it well to confine the investigation to general questions and answers. The main point considered was: Is soft or hard steel preferable under general conditions for building, what limits of strength should be given in specifications and what tests are required? The answer is, that in general soft steel is preferable. For ordinary purposes the tensile strength should be between 23.45 and 28.60 tons per square inch, with a minimum elongation of 20 per cent. in test bars eight inches long. For bridge work the tensile strength should be between 23.45 and 27.30 tons. It was not considered advisable to specify any chemical analysis, as the physical properties afford a sufficient index to the quality of the metal, this quality being dependent not only upon the composition of the metal but also upon the mechanical combination of the different constituents. In considering if it be necessary to specify not only the class of material but also the manner of its manufacture, the committee decided that the specification should be limited to such normal conditions as could be certainly complied with, and that any minute limitations were technically impracticable and commercially injurious. The committee states, however, that except when unavoidable, the material should not be worked at a blue heat. In regard to the increase of working load the committee states that it can profitably be increased to 6.35 tons for live loads and 7.62 tons for dead loads. As to the meaning of the term "Flusseisen" (ingot iron) it may be said that, strictly speaking, it is limited to the product of the basic open hearth furnace and the Thomas or basic Bessemer converter. Acid open hearth metal can not always be included.

THE BASIC BESSEMER PLANT OF THE POTTSTOWN IRON COMPANY.*

By Joseph Hartshorne.

(Concluded from page 465.)

About two-thirds of the charge is first poured into the casting ladle. When the slag begins to flow over the slag-spout, the pouring is stopped, and from 1% to 1.5% of a 10% spiegel is thrown into the ladle. The pouring is then completed. The casting is done as slowly as possible, through a two-inch nozzle. Every care is taken to make the steel solid. The mold is filled up to the height of the ingot, allowed to settle, again filled up, and so on until no more metal can be got in. Towards the last not more than 30 to 50 pounds can be added at a time. In this way a very solid ingot is obtained. In spite of the very low carbon steel which is made, the metal rarely rises in the mold after pouring ceases; in fact, it generally sinks a little. The cap used is simply a cast iron plug, which is laid on top of the metal without being keyed down. No sand is used in capping.

During casting, one or two 4-inch ingots, weighing about 50 pounds each, are made for testing purposes. The tests made from these ingots form a very important part of our process, and upon them depends, in a large measure, the success we have reached in making very soft steel. The test ingot is taken to the blacksmith shop, and brought up to an even white heat. It is forged down as quickly as possible under the 1,000-pound hammer to a bar 1 1/4 inches square. From this bar two pieces eight inches long are cut off. The first indications of the quality of the steel are obtained from this forging. The hammer marks should be perfectly sharp and distinct, without cracks of any kind. The bars are heated to a full cherry red. One of them is chilled in cold water, and the other is laid on a piece of fire brick, where it is allowed to cool off slowly.

The chilled piece is placed on an anvil across a V-shaped opening. This V is five inches wide at the mouth and 2 1/4 inches deep. A small fuller is laid on the bar, and it is struck comparatively light blows by the 650-pound hammer until it is bent down into the V. The number of these blows is counted. The piece is then reversed and struck again until it is either broken or bent down into the V. This operation is kept up until the bar is broken. The heat number and the number of blows required each way are stamped on the pieces, as follows:—say, 8,197 6-4. This means that it required six blows in one direction, four in the other, and one after the second reversal, to break the bar. This work should be done under a drop hammer, in order to insure perfect similarity in the force of the blow for all tests. The fractures of this test piece are used as an indication of the degree of hardness of the steel, taken in connection with the number of blows required to break it. The surface is also examined for flaws of all kinds, such as checks or cracks on the edges, V-shaped cracks on the sides, scabs, etc. The number of blows and the appearance of the fracture and surface of the test piece is entered on the report by means of a set of symbols. This is done for all the tests, and preserves a complete description of them, which can be referred to at any time in the future.

The unchilled piece is treated in the same way. The surface and edges give the same indications as does the chilled piece, and merely confirm or correct them. The fracture, however, gives an accurate measure of the amount of phosphorus contained in the steel. From its appearance the amount of phosphorus can be read by a skilled observer to within 0.01%. That is, the difference between 0.04% and 0.06% is very perceptible, when one knows how to see it.

After the 1 1/4 inch tests have been cut off the original bar, it is forged down to 5/8 of an inch square, and three pieces 10 inches long are cut off. Two of these pieces are heated to the same temperature as the 1 1/4 inch pieces were. One of them is chilled in cold water, and the other is allowed to cool slowly on a piece of fire-brick. The chilled piece is nicked two inches from one end, and the short piece is broken off. This fracture is simply intended to confirm the indications given by the 1 1/4 inch piece. The longer piece is bent on a bending machine

until it shows a crack. This test gives one of the best indications of the softness of steel, and is used for grading it according to Turner's scale. For the purpose of allowing closer grading, the scale has been extended from seven to twenty-two divisions. This has been done by adding a hard and a soft grade to each of the original sevens, and an extra soft grade at the end. That is, there is a 7 hard (7h.), a 7 even (7-), a 7 soft (7s.), and a 7 extra soft (7ss.), and the same for the harder grades. We are rarely called upon to make a steel harder than 5s.

The other 5/8-inch piece is treated in the same way, and the results are used to check those obtained from the other tests. These four tests enable us to grade our steel very closely for chemical composition, and for physical properties when cold. This grading is done while the ingots are still in the blooming mill furnaces, and the steel is assigned to the various orders according to the grade shown.

We also have a test for red-shortness, called the "ear-test," which is very searching. It is for this test that the third 5/8-inch piece is used. It is first drawn out to a rather blunt point, and then flattened out to 3-16 of an inch (5 mm.) thick. This gives a lenticular shaped piece about 1 1/4 inches wide, 6 inches long and 1/4 of an inch thick, with a stem at the wide end. The pointed end is slit for about 1 1/2 inches, and two 3/4-inch holes are punched through the metal. The first hole is 1/4 of an inch from the slit, and the second is 1/4 of an inch behind the first. The ears formed by the slit are turned away from each other until they stand at right angles with the axis of the test piece. The holes are then drifted out to 1 1/2 inch in diameter, and the ears are turned back until they almost touch the sides. This may seem a very complicated proceeding in the description, but it is very simple in reality. The metal is kept at a bright cherry-red during the whole process, being heated as often as is necessary. It is a very sensitive test, when well made, and reveals the slightest trace of red-shortness.

These tests show very clearly the quality of the steel produced, and, therefore, the result of the treatment to which the charge has been subjected. They form the criteria for judgment as to the success of each operation, and determine how the next one is to be carried out. By long series of observations, it has been determined how much deoxidizer and recarburizer is required for any given number of revolutions per ton of pig iron, necessary to make dead soft steel. That is, if the tests show that a certain number of revolutions per ton of pig iron charged, say 40, is necessary to make the softest steel, very low in phosphorus and free from red-shortness, then a certain definite amount of deoxidizer must be used. This amount of deoxidizer, under these conditions, will give a steel containing about 0.06% of carbon, and 0.25% of manganese, with 0.03% or less, of phosphorus and 0.03%, or less, of sulphur. This practice presupposes that the pig iron used is regular in composition. It is impossible, in making the best grades of steel, to mix irons or scrap of greatly varying compositions in the cupola charge, and then to get a sufficiently regular metal as it comes from the cupola. The various constituents of the charge have different melting points, and, therefore, will melt at different times, or rates of speed. The melted cupola metal will show considerable variations under these conditions. For the very best work, therefore, it is necessary to have a regular mixture. For ordinary work, say for steel containing about 0.10% of carbon, 0.06% of phosphorus and 0.40% of manganese, this is not so necessary, since successive heats will not vary enough to do any harm, under our system of treating each blow according to the indications given by the one immediately preceding it.

When a heat is blown, the tests are very carefully examined. If they are normal for the grade of steel desired, the next heat is blown in the same way, and the same amount of recarburizers is used. If the tests show too much phosphorus, the number of revolutions per ton of iron charged is increased and also the deoxidizers in proportion. If the steel is low in phosphorus, but red-short, the number of revolutions per ton is increased. High phosphorus together with red-shortness indicates that the number of revolutions per ton is too small, and that, through some error, the amount of recarburizer is too low, in proportion to the number of revolutions per ton. This latter is a very

* Read at the Reading Meeting of the Amer. Inst. Min. Engrs., October, 1892.

TABLE I

Blow Number	Heat of vessel	Heat of bath	Vessel Number	Turned downward	Blow					Slag	Number of tuyeres changed	Grade	Analysis			
					Revolutions		Length of blow	Average blast pressure	Interval				Carbon	Sulphur	Phos.	Manganese
					Blow	After Blow										
6,961	77	68	1	6.18	928	488	14	31		S	7ss	.09	.035	.305		
6,962	93	96	3	6.48	800	488	13	32	30	S	7ss	.10	.030	.425		
6,963	78	69	1	7.18	900	488	14	32	30	S	7ss	.09	.035	.290		
6,964	97	97	3	7.46	920	464	14	32	28	L/W	7s	.10	.050	.335		
6,965	70	70	1	8.15	930	464	14	32	29	V/S	7ss	.10	.035	.380		
6,966	98	98	3	8.43	840	464	13	32	25	V/S	7s	.13	.035	.350		
6,967	80	71	1	9.12	900	464	14	32	29	V/S	7ss	.09	.040	.310		
6,968	99	99	3	9.37	868	464	13	32	25	V/S	7s	.09	.030	.290		
6,969	81	72	1	10.05	840	464	13	32	28	V/S	7ss	.11	.035	.485		
6,970	100	100	3	10.30	880	464	13	33	25	V/S	7s	.10	.040	.325		
6,971	82	73	1	10.55	780	464	12	33	25	V/S	7s	.08	.040	.380		
6,972	101	101	3	11.20	840	464	13	32	25	V/S	7ss	.09	.045	.390		
6,973	83	74	1	11.45	868	464	14	33	25	V/S	7s	.10	.040	.420		
6,974	102	102	3	12.15	900	464	14	33	30	V/S	7s	.10	.040	.425		
6,975	84	75	1	12.45	900	464	14	33	30	V/S	7s	.11	.040	.410		
6,976	103	103	3	1.14	900	464	14	32	29	V/S	7s	.11	.049	.410		
6,977	85	76	1	1.44	920	464	14	32	30	V/S	7s	.09	.055	.315		
6,978	104	104	3	2.14	900	444	14	32	30	V/S	7s	.09	.050	.425		
6,979	86	77	1	2.44	925	444	14	33	30	V/S	7s	.07	.045	.340		
6,980	105	105	3	3.12	900	444	14	32	28	V/S	7s/7ss	.12	.040	.465		
6,981	87	78	1	3.42	1,700	444	15	32	30	V/S	7s	.09	.035	.445		
6,982	67	391	2	4.12	920	444	14	32	30	V/S	s	.13	.045	.405		
6,983	88	79	1	4.40	900	444	14	32	28	V/S	ss	.10	.055	.380		
6,984	68	392	2	5.10	830	444	14	32	30	V/S	ss	.10	.025	.405		
6,985	89	80	1	5.36	900	454	14	32	26	V/S	ss	.09	.040	.415		

rare combination, and is generally due to some mistake of the weigh-masters'.

In this manner the tests of one heat not only indicate the quality of the metal made, but they also furnish explicit directions as to how the next heat is to be operated upon. Besides these tests, the carbon, phosphorus and manganese is determined chemically in each heat, and the sulphur in every fourth heat. These analyses are used principally to check the other tests, and in that way to keep the graders up to their work.

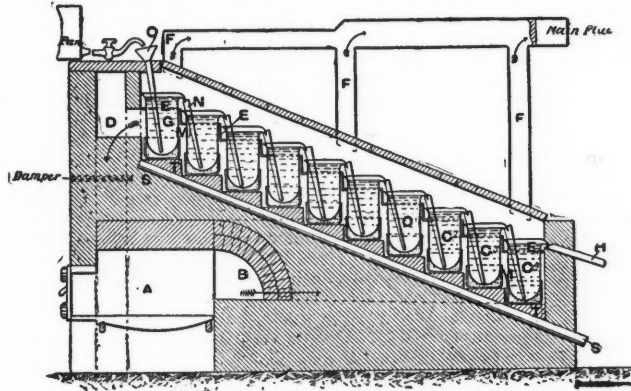
As a matter of general interest, I may add that, working single turn we have made twenty-five heats in twelve hours, the average being twenty heats. The blooming mill has rolled 250 tons of ingots in one turn, into assorted sizes, mostly nail slabs. We have been running double turn only since the 1st of September last, and the best we have yet done is thirty-eight heats in twenty-four hours. There is no reason why we should not surpass our single turn record, when the new men are thoroughly broken in.

As an indication of the quality and regularity of the steel which is made, I add a few analyses, etc.

Table 1 is a partial report of a single day's work.

Table 2 is a series of five heats in which a sample was analyzed from each of the four ingots.

Table 3 is a series of eight samples from each of the four ingots of blow No. 5,584. The ingots were 16 1/2 x 20 1/2 x 78 inches in size. They were rolled into slabs 19 1/2 x 2 1/2 inches in section. The first sample of each ingot was cut off two feet from the top end, and the others were cut every four feet. We have made many such sets of samples as



PLANT FOR THE CONCENTRATION OF SULPHURIC ACID IN GLASS VESSELS.

those contained in tables 2 and 3, all of which are about like the examples given.

TABLE 2.

Blow No.	Ingot No.	C.	S.	P.	Mn.
6997	1	.09	...	.040	.630
	2	.10	...	.030	.740
	3	.11	...	.040	.650
	4	.09	...	.035	.650
6998	1	.08	...	.035	.325
	2	.08	...	.030	.320
	3	.08	...	.030	.325
	4	.08	...	.040	.300
6999	1	.08	...	.045	.415
	2	.08	...	.035	.425
	3	.08	...	.050	.405
	4	.08	...	.035	.415
7000	1	.10	...	.035	.425
	2	.10	...	.050	.390
	3	.11	...	.055	.455
	4	.10	...	.055	.445
7001	1	.10	...	.030	.440
	2	.09	...	.050	.430
	3	.10	...	.050	.450
	4	.09	...	.050	.450

These samples were cut every four feet out of a 19 1/2 inch x 2 1/2 inch slab, rolled from a 16 1/2 inch x 20 1/2 x 78 inch ingot. Four ingots to a heat.

TABLE 3.

Ingot Sample		Blow No. 5584.			
No.	No.	C.	S.	P.	Mn.
1.	1	.06	...	.020	.205
	2	.06	...	.020	.205
	3	.06	...	.020	.210
	4	.07	.030	.025	.215
	5	.06	...	.020	.220
	6	.06	...	.030	.220
	7	.07	...	.030	.230
	8	.06	...	.020	.195
2.	9	.06	...	.025	.205
	10	.05	...	.025	.210
	11	.05	...	.025	.210
	12	.07	.030	.025	.210
	13	.05	...	.030	.220
	14	.05	...	.020	.225
	15	.07	...	.030	.210
	16	.07	...	.020	.210
3.	17	.06	...	.025	.205
	18	.07	...	.025	.210
	19	.06	...	.020	.205
	20	.07	.029	.025	.200
	21	.07	...	.030	.210
	22	.07	...	.020	.205
	23	.07	...	.025	.210
	24	.07	...	.020	.220
4.	25	.07	...	.025	.190
	26	.07	...	.045	.175
	27	.06	...	.025	.175
	28	.07	.033	.025	.215
	29	.07	...	.020	.190
	30	.06	...	.025	.185
	31	.07	...	.025	.180
	32	.07	...	.025	.200

[The general plan of the basic Bessemer plant at Pottstown, given in our last issue, represents its condition in 1891, and does not include some changes made recently. These are for the most part concerned with the handling of the product.—Ed. E. & M. J.]

THE CONCENTRATION OF SULPHURIC ACID IN GLASS VESSELS.

With the present high price of platinum many attempts are being made in Europe to dispense with the platinum still which has been used for several years in concentrating sulphuric acid. Manufacturers appear to be going back to glass concentrators. This week *Industries* describes a new glass concentrator which is in use at Levinstein's chemical factory at Manchester, England. As will be seen in the accompanying illustration, ten glass vessels to each, 10 in. diam. and 21 in. deep, are arranged on a terrace *T* of Stourbridge tiles. The steps are 24 in. long and 12 in. wide, and each step is 5 in. below the one above. The glasses rest on beds of clean sand in cast iron dishes. Each glass has a pouring spout which discharges into a funnel leading to the bottom of the glass below.

By this means the acid circulates throughout each glass and the concentration is thus made much more rapid and efficient. The heating gasses from the furnace *A* pass along the side flues *I* and enter the terrace

through the apertures *C* *C*₂ *C*₃ *C*₄. The heating gases are prevented from approaching the surface of the acid in the glasses by the cast-iron terrace *E*. After circulating round the glasses they pass to the chimney through *D*. The fumes of concentration pass up the lead flues *F* to a coke column for condensation. In case a glass breaks the gutter *S* at the side catches the spilled acid. The concentrated acid that comes away from the porcelain spout *H* at the bottom is lead first to another series of glass coolers and afterwards to the usual lead coolers. The interposition of the glass coolers is arranged because it is found that sulphuric acid at a high temperature has an effect on lead. The output of a plant of this sort is 30 tons of acid per week; the consumption of fuel is 5 tons of coke, and only two men are required to attend to it, one at night and one at day. The plant works with success and more will be built of the same pattern at Manchester.

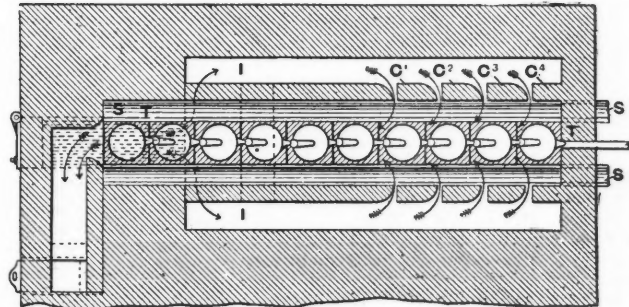
CONVEYING CULM BY BLOWERS.

Written for the Engineering and Mining Journal.

The Edgerton Coal Company, of Jermyn, Pa., have recently placed an automatic culm remover in their breaker that greatly reduces the cost of handling the 300 to 400 tons of culm made daily.

The old method of handling the culm was by a plane 700 ft. long and at a daily cost of \$16 for labor, exclusive of ropes, rails, ties, cars and trules. Under the new method the cost of labor is reduced to \$1.45 per day, and the man in charge of the blower also oils the breaker, as under the present method the blower is run only six hours out of the ten hours worked per day.

The blower is operated by a pair of first motion engines 13 in. by 16 in. direct acting, running at a speed of 125 revolutions a minute. This gives the power to cause a positive blast from a blower 5 ft. 6 in. long by 3 ft 9 in. diameter, which revolves at the rate of 125 revolutions per minute.



A 10 in. cast iron flanged pipe is run from the floor under the hopper situated beneath the culm chute and as the culm is drawn from the chute into the hopper it is fed into the blast pipe by means of a worm revolving at two-thirds the speed of the blower.

Here it is struck by the blast from the blower and conveyed in a continuous stream on a pitch of 22° to the top of the bank at a vertical height of 125 ft. above the hopper with sufficient force to throw it from 100 to 200 ft. beyond the mouth of the pipe, the heavier pieces being thrown the greatest distance. The blower is run on a pressure of 4 lbs. to the square inch and large pieces of slate are handled as easily as the finer pieces of culm and it will convey any material that will pass through the pipe.

The culm flows through the center of the orifice and has a cushion of air around it. The line of pipe is now 400 ft. long and the line will be extended to 1,200 ft. and until it reaches a vertical height of 200 ft.

The cost of the plant at the Edgerton breaker is \$4,500, including one blower and two first motion engines on one bed-plate.

Feed arrangement and friction gear, counter shaft, boxes and belt pulleys and the actual cost of operating it exclusive of steam power does not exceed \$1.50 per day, including labor and oil; besides there is no cost for keeping up tracks, ropes, mules, cars, or trestling to hold the pipe as the culm is blown to a distance beyond the mouth of the pipe.

The machines are made in different sizes and capacities as follows:

No.	Size engine.	Capacity per hour.	Distance conveyed horizontally.
		Tons.	Feet.
3	7 in. x 10 in.	12 to 15	1,000
4	9 in. x 12 in.	15 to 18	1,000
5	10 in. x 15 in.	18 to 26	1,000
6	13 in. x 16 in.	23 to 35	1,200

The Efficiencies of Boilers.—In a recent discussion by the Engineers' Club, of Philadelphia, this subject, Mr. Strong stated that the difficulty in the way of introducing producer plants and gas engines is the first cost and difficulty of starting the engines; but this later difficulty will probably be soon overcome, and the gas engine will then supersede the steam engine in many cases. An engine has been designed, which is to make a horse power on 13 pounds of water, to carry 180 pounds pressure in the boiler allowing the gas to escape at 250 deg., and evaporating 12 pounds of water to a pound of coal. Many think that the locomotive is an uneconomical steam engine, but it really compares very favorably with the general run of automatic engines to be found. A few years ago a test was made on the Lehigh Valley Railroad, under favorable circumstances on a boiler having 1,848 sq. ft. of heating surface. 900 H. P. was developed, eight pounds of water being obtained per pound of coal, and in another boiler which was tested, 28 pounds of water to the horse power were used, while in the one first spoken only 20 pounds were used. The Boston sewage pumping plant is getting about 12 pounds of water per pound of coal, using two sets of boilers. In the locomotive we get 9 pounds of water while we were making 2 H. P. for each 2 sq. ft. of grate. As opposed to this, Mr. Spangler said that he doubted very much whether he boiler had been made which would average 12 pounds of water per pound of coal.

THE VOLATILIZATION OF QUARTZ.

Dr. Seger, a well known German ceramic technologist, has published a paper, in which he claims to have volatilized quartz in an appreciable quantity. The furnace employed was what is known as the Deville pattern, and consisted of a single cylindrical sheet-iron case lined with dead-burnt magnesite, leaving an internal cavity of about 5 in. diameter and 11 in. high. The magnesite lining only extended about two-thirds the length of the cylindrical casing, which was divided at that point by a perforated iron plate, forming the floor of the furnace proper, and supporting the crucible. Below this division was the air chamber, into which a blast was injected by a side opening, and which served for the preliminary warming of the air before it came in contact with the burning fuel. The crucible was of carbon, and was inclosed in another of magnesite. The fuel used was retort carbon, and was kindled by a few fragments of burning charcoal. The quantity of the former used was 4 kilogrammes, which is certainly a very moderate expenditure. After the experiment it was found that the quartz had undergone fusion, to judge by its appearance, and was noticeably smaller. When weighed it was found to have been reduced to the extent of over 40%, the total mass taken being about 2.5 grammes, and the quantity that had disappeared amounting to 1.1 gramme. That this was in no sense due to accident was proved by repeating the experiment with another piece of quartz, with a precisely similar result. The comparative constancy of the loss might lead to the supposition that there was some limiting factor in the volatilization, but a second heating of the same test-piece caused a further loss of about 15% on the original weight, and on repeating the heating twice the piece of quartz vanished altogether. It was observed in the course of the experiments that when the quartz was cooled rapidly it had an opaque porcelain-like aspect, while when the cooling took place gradually the test-piece was perfectly transparent.

The results we have recorded are sufficiently startling, and if they had emanated from a less careful technologist than Dr. Seger, would be regarded with some doubt. Even as it is, one cannot help wishing that further details were forthcoming.

ABSTRACTS OF ANNUAL REPORTS.

Boston and Montana Consolidated Copper and Silver Mining Company.

The report of the trustees of this company for the year ended June 30th, 1892, shows that the production of matte at the Butte and Great Falls works amounted to 52,060,355 lbs., yielding 28,564,864 lbs. of refined copper from which was realized \$2,693,559.49. There was also produced 286,820 oz. of silver for which payment was received on 112,898 oz. at 83 cents or \$92,977.66, and making a total of gross receipts of \$2,786,537.15.

The costs amounted to \$2,360,131.64 showing a mining profit of \$426,404.51. This, together with the balance from the previous year of \$621,715.60 and the receipts from the third issue of bonds \$540,000 made a fund available for construction, dividends and redemption of bonds amounting to \$1,588,120.11. This was completely absorbed and liabilities amounting to \$156,603.02 incurred by the following items of expense.

Dividends No. 13 and 14.....	\$250,000.00
Mining property purchased.....	6,160.00
Construction at mine.....	91,100.43
" Great Falls.....	918,702.75
" Electrolytic plant.....	18,322.43
To complete.....	231,677.57
Bonds bought, redeemed and cancelled—first issue.....	47,000.00
" " " second issue.....	47,000.00
Interest on bonded debt, premiums on bonds redeemed and other interest.....	134,759.95

Total.....\$1,744,723.13
Balance of liabilities, June 30, 1892.....\$156,603.02

From the report of the mine superintendent, Mr. Thomas Couch, it is learned that the amount of ore mined reached 163,528 tons, divided as follows:

Mine.....	Tons.
Moose.....	5,810
Mountain View.....	56,600
Pennsylvania.....	50,779
East and West Colusas.....	50,309

This ore was distributed as follows:

To roast heaps.....	Tons.
To concentrators.....	14,224
To furnaces direct.....	125,295
To calciners.....	9,069
Shipped direct.....	2,714.5
To Great Falls.....	186.5
	12,039

The ore treated carried 9.13% copper. It is stated that the cost of copper in the matte at the mine amounted to 5.91 cents, and at New York, including freight, commissions, etc., 7.69 cents per lb.; 9.43 cents was received.

From Mr. Couch's report we derive the following account of the mines:

The Leonard Shaft.—The vein where intersected by the crosscut on the 600 level is not as rich as in the level above, but it is all workable, and will be concentrated. The raise connecting the 500 ft. level followed the vein through and exposed a continuous ore body of good quality.

East and West Colusas.—The new developments made are confined to the 500 ft. level of the East Colusa, and the 500 ft. level of the West Colusa. These levels are 100 ft. apart vertically, the surface of the West Colusa shaft being 100 ft. higher elevation than the surface of the East Colusa. The developments in both of these 500 ft. levels have been very satisfactory, and a very considerable increase to our reserves has been added by them. The vein in the 500 West Colusa is of considerable width, widening out in places to fully 30 ft. The ore as a whole is not rich, but is generally good average ore.

Mountain View Mine.—No sinking has been done in this mine during the year. The second crosscut on the North vein—1,000 ft. level—was extended to a point immediately under the 900 ft. level, but nothing except a few small stringers of quartz was found. We then started a winze from the 900 ft. level down, and at a point about 30 ft. below the level the vein changed its dip from nearly vertical to an angle of about 45° in North, thus showing the crosscut on the 1,000 ft. level to be yet about 40 ft. from the vein. The ore in the winze is good. About 5 ft. of it is being

carried by the winze and no hanging wall is visible. The crosscut on the 1,000 ft. level will be extended to intersect the vein and winze at once. The crosscut on the South side of the shaft has been extended to the South vein during the year. This vein is yielding very well, and adds a new level to our reserves. It will partly compensate for the 56,000 tons of ore extracted from the stopes in the upper levels.

Pennsylvania Mine.—The developments in the levels both East and West of this mine have been very satisfactory, and while no new levels have been opened, the showing exhibited by the lower 430 ft. level is a guarantee that the next, or 530 ft. level, will be equally productive as those about it.

Moose Mine.—This mine has been operated most of the year, and the silver in the matte was furnished by the ore from it. A crosscut is being driven to cut the vein South of the shaft on the 300 ft. level. The vein in the 200 ft. level, while not large, yields very good ore. It ranges from one to two ft. in thickness. On the North side of the shaft the vein is much larger, but the ore of lower grade.

General Remarks.—During the rainy season just past, we experienced great trouble with the water in the Colusa mine. The water percolating down through the old stopes of the mine took up copper and sulphuric acid, and thus charged, it played havoc with the pumps in all directions. It seemed at one time that all of our pumps would be lost, but fortunately the rain let up and the water improved, or lost its acid in part, and the situation again became normal. This water is at all times bad. The expense incident to its use in boilers has always been very heavy by way of repairs. We have now, however, a prospect of having first-class water for boiler uses from the Butte City Water Company.

ESTIMATION OF PHOSPHORIC ACID.

Spica's method for the estimation of phosphoric acid is subjected to an adverse criticism by Carl Arnold and Konrad Wedemeyer in the *Zeitschrift für angewandte Chemie*, Oct. 15th, 1892.

It was based on the precipitation of the phosphoric acid, as ferriphosphate, from a neutral solution, by means of potassium ferrisulphate. It was a volumetric method, the double sulphate of potash and iron being allowed to flow drop by drop into the phosphoric acid solution, to which a few drops of salicylic acid had been added. A violet color was produced, which became more and more intense the nearer the end reaction was approached. After the precipitation was complete and the precipitate had settled to the bottom of the beaker, the supernatant liquid was still of a violet color. This disappeared on heating, and an attempt was made to base on the difference in color a method for the accurate estimation of the phosphoric acid.

Arnold & Wedemeyer, however, state that this can not be done. They used the method more particularly with Thomas slag, and compared the results with the standard Molybdate method only to find that in one case the Spica method gave 16.59% as against 17.88% with the Molybdate, and in another case 8.86% against 9.18%.

Spica's recommendation to determine the phosphoric acid in Thomas slag by setting it free with concentrated sulphuric acid and then extracting it with absolute alcohol was found not to be advisable. The sulphates formed hold the phosphoric acid obstinately and irregularly. Even large quantities of absolute alcohol (1,000 c. c. to 5 gms.) failed to extract all of the phosphoric acid, 0.29% still remaining in the sulphates.

Spica's method, therefore, does not appear to recommend itself to the analyst.

DIGEST OF RECENT DECISIONS.

RIGHT TO WATER IN NATURAL STREAMS IN COLORADO.

The water of every natural stream of Colorado is the property of the public. By a diversion and use for irrigation, a priority of right to the use of the waters of the natural streams may be acquired. This priority is a property right, and, as such, is subject to sale and transfer. There must not only be a diversion of the water from the natural stream, but an actual application of it to the soil, to constitute the appropriation for irrigation, recognized by the constitution. A diversion, unaccompanied by application, gives no right. The awarding of priorities of ditches, in excess of the amount of water actually appropriated at the time, is error. A diversion and promise to use in the future will not support such a decree. —*Ft. Morgan Land & Canal Co. v. South Platte Ditch Co.*, Supreme Court of Colorado, 30 Pac. Rep., 1033.

INFRINGEMENT OF PATENT PACKERS FOR OIL WELLS.

In letters patent No. 167,400, issued Sept. 7, 1875, to James P. Gordon, for an improvement in packers for shutting off water from oil wells, consisting of (1) a tubular casing, (2) an expansible packer, and cone for expanding it, and (3) a set of slips or wedge arms, and a wedge cone to force the arms against the wall of the well, to form a resistance base to the packer, so that when the casing is moved lengthwise the cone within the packer will expand it, the third element is moved and is the basis of the entire device, and the patent is infringed by a device making use of the same idea by mechanical equivalents, their position merely being reversed although in such device the wedge arms, besides serving to place the packer in position, as in the combination patented, have the additional function of aiding in sustaining the casing. —*Masseth v. Palm*, United States Circuit Court, W. D. Pennsylvania, 51 Fed. Rep. 824.

RIGHT OF LESSEE OF MINE TO MAINTAIN SUIT FOR ORE TAKEN.

When a person is in possession of land under a mining lease which gives him the exclusive right to mine for a certain term of years, subject to the payment of a royalty, and requires him to mine a certain number of tons each year, and as much more as can reasonably be mined on the land, and by which he is bound to pay for that same number of tons each year, whether mined or not, but with the privilege of crediting any such payment for ore not mined on one mined in excess of that number of tons in any succeeding year he has such property in ore before it is mined, that he can maintain an action against one who mines it without his consent. In such an action he may recover damages equal to the value of the ore mined, less the actual cost of mining it, and less any royalty which may have been paid by the person who so mined it to his lessor, and in such an action it is no defence that one mined the ore while in possession under claim of right, when his only possession was that which enabled him to convert the ore. —*Hartford Iron Min. Co. v. Cambria Min. Co.* Supreme Court of Michigan, 53 N. W. Rep., 4.

MURDAY'S FIRE-DAMP DETECTOR.

The instrument here illustrated is intended for estimating extremely small percentages of fire-damp in the air of coal mines, and is much more sensitive than any other apparatus of the kind in the market. It will indicate the presence of less than 0.1% of fire-damp or about the 100th part of the amount necessary for an explosion. The principle on which it works, however, is the same as has been applied before for the same purpose. There are two platinum wires, one in a sealed chamber and the other in a cage of wire gauze through which the air of the mine penetrates. Equal electric currents from a dry storage battery pass through these wires, and heat them up to a certain necessary temperature. When there is no fire-damp in the air the galvanometer needle points to zero. When, however, fire-damp comes in, the platinum wire in the gauze chamber commences to glow according to the well-known property of this metal.

This glowing causes a variation in the current which passes along the wire, and this variation is indicated by the galvanometer needle. The amount of glow depends directly on the percentage of fire-damp present, and thus the deflection of the galvanometer needle indicates accurately the amount of gas present in the air. An alarm bell can be adjusted in such a way that when a certain percentage is reached, it is automatically rung. When the apparatus is not in use, the tension of the springs in the

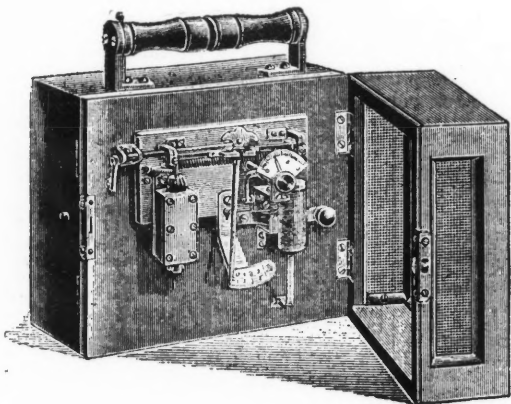


FIG. 1.

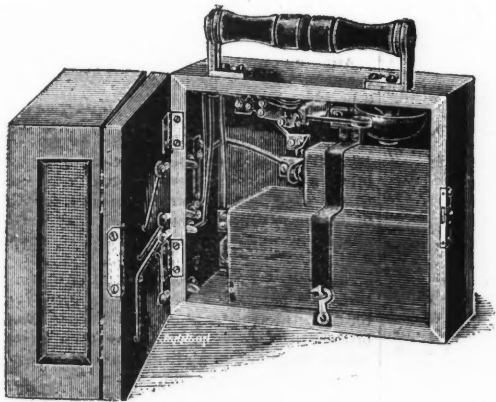


FIG. 2.

MURDAY'S THERMO-ELECTRIC FIRE-DAMP DETECTOR.

indicating mechanism is taken off by pressing a knob in order that the life of the apparatus shall be prolonged as much as possible. It will be seen that the apparatus is automatic and the readings are direct.

AUTOMATIC BOLT CUTTER AND NUT TAPPER.

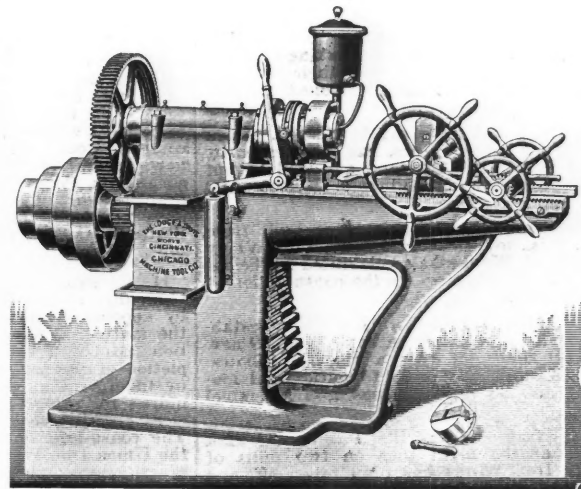
The accompanying illustration shows an improved automatic bolt cutter and nut tapper, designed by the Lodge & Davis Machine Tool Company. The machine is designed to cut bolts from 3/8 in. to 1 1/2 in. in diameter and to tap corresponding nuts. The entire frame is cast in one piece so as to give additional strength, and further stiffness is obtained by supporting the front of the machine on which the carriage slides by a heavy brace. The driving cone is of extra large diameter and it is provided with wide steps. The gearing is proportioned at the ratio 5:1 and the face is larger than usual.

The carriage has a feed of 17 in. and a bearing of 13 in. gibbed to the shears. The jaws of the vice are arranged so as to take the full capacity of the machine without being changed. The jaws are also arranged to take several nuts at once, and thus a great saving in tapping is effected. The head is positive in motion and an automatic stop is provided for opening the dies in any position of the carriage. The dies have a large bearing in the barrel and ring, and also have a fine adjustment. Every part is accessible from the outside and the dies can be changed in less than a minute. The machine is provided with a force pump which throws a constant stream of oil into the tank over the head. The frame of the machine is used as a reservoir to receive the strained oil after being used in the machine.

Lead in Southeast Tennessee.—The lead deposits of Southeast Tennessee are again attracting attention. Mr. E. Hedburg, of Joplin, Mo., has recently visited Bradley county, and seems to think the deposits worthy of consideration. Thirty years ago Prof. J. M. Safford stated that there was scarcely a county in East Tennessee in which lead ore might not be found, but, aside from some operations conducted by the Confederate Government between 1861 and 1863 at the Hambricht mine, four miles south of Charleston, Bradley county, there does not seem to have been much done. In fact, the Hambricht mine has been in a chronic state of about to produce since 1851. The ore here was galena in heavy spar, the thickness of the vein being about 8 in., and of the ore itself from 1 to 4 in. Blende and other zinc ores were associated with the lead. Masses of galena weighing several hundred pounds have been found. The country rock is Knox dolomite and lower carboniferous limestone (MacLuria). Bell & Co. worked the Carter mine, three miles east of Sweetwater, Monroe county, as early as 1836, but operations were suspended shortly afterward and were not resumed till 1859, but even then were inconsiderable. It is possible that the recent developments made by the Blue Springs Mining Company, of Chattanooga, near Blue Springs, Bradley county, may lead to the discovery of workable deposits of lead and zinc, or both. Geologically, the district is promising, the known occurrence of the ores of these metals in the county is encouraging, and the employment of competent engineers with no axe to grind and backed by sufficient capital, is a *sine qua non* which those concerned in the matter seem to appreciate at its full value.

There is no use in trying to "boom" the district, or in holding out extravagant expectations of profits. Let the matter be regarded in a conservative light, shed upon it by careful and painstaking investigations before the general public is invited to the feast. The discovery of lead ore in southeast Tennessee is nothing new, its presence there has been known for more than 60 years, and up to this time the discovery remains unutilized. This may not prove it to be valueless, but does indicate an apathy which will not be easy to overcome.

Rock Blasting.—Samuel Whinery, Vice-President Am. Soc. C. E., gave his experience of twelve years ago when in government employ, in blasting rock, both under water and in quarries, at a meeting of the Society of Civil Engineers. A very accurate account of all expenses was kept, and all blasting was done by electricity. In a quarry of solid limestone with a face 50 ft. high and ledges 6 to 12 ft. thick, the stone being moved from the level of the bottom, a distance of about 60 ft., to flatboats, the actual cost of rip-rap stone for labor, tools and material was



AUTOMATIC BOLT CUTTER AND NUT TAPPER.

28 1/10 cents per cubic yard as measured in the solid rock by cross-sectioning. This was the average on three months' work. Large masses were moved by derricks. Water tamping was found to be insufficient in 18 in. depth of water. Sharp sand in water did not give a good result. Plaster of paris succeeded, but was expensive. Pebbles screened to obtain those about the size of grains of corn were best.

Mr. Whinery advocated the use of testing machines, and described a simple one he used successfully. He stated that every fuse should be tested, and the result will be a large saving of time.

He further stated that leading wires for moderate distances need not be insulated, and four exploders can be fired with a naked wire passing through 100 ft. of water. Much of the material in the use of high explosives is wasted. It is almost impossible to get foremen to use only a sufficient quantity of dynamite. The desired result was reached in this case by a rod of wood, one side of which was graduated to feet and tenths and the other side to inches of dynamite to be used, the latter being obtained by computation. This was used by laying it on the rock, in the direction of the line of least resistance, and employing the amount of dynamite indicated on the rod for the distance measured. The saving of 50% was effected by this means. Mr. Parker stated that in blasting at 125th street, to get a uniform depth of 12 ft. at low tide, or 17 ft. at high tide, he had fired seven holes with no attention to insulation of the wires. The "rack-a-rock" explosive has been used, and it often happens that the exploders are fired without firing the cartridge; this is, however, believed never to occur with dynamite. In this depth of water, there has been no trouble about tamping.

E. P. North mentioned a case of chilled dynamite cartridge six feet under water which was not fired by an eight grain exploder, the latter being thrown out only. Two such exploders fired the cartridge.

PERSONALS.

Mr. Algernon Del Mar, Associate of the Royal School of Mines, has been appointed Assistant Manager of the Gold Prince Mine at Ferris, California.

Mr. F. D. S. Broughton, has been appointed assistant superintendent of the Oro Fino mine, Oradwood, South Dakota, under Dr. Carpenter, and yesterday entered upon his duties.

Mr. T. W. Robinson has resigned the management of the Bay View blast furnaces of the Illinois Steel Company at Milwaukee, Wis., to accept the position of general superintendent of the Colorado Fuel and Iron Company's iron and steel plant at Pueblo, Colo.

Mr. Francis I. Gowen has been appointed chief assistant general solicitor of the Philadelphia & Reading Railroad. He is a nephew of the late President Gowen, of the Philadelphia & Reading Railroad Company, and a son of the late James E. Gowen, for many years the general counsel of the company.

President C. B. Andrews, of Brown University; Guy Andrews, Senator William B. Allison, Thomas W. Cridler, Ronald P. Faulkner, Chandler Hall, Thomas T. Keller, James B. McCreary, of Kentucky, and Joseph T. Morgan, sailed from this city for Bremen on the 12th inst., to take part in the monetary conference to be held at Brussels on Nov. 22. Mr. Faulkner is to be Secretary of the conference, and Mr. Cridler is the disbursing officer.

INDUSTRIAL NOTES

The Carnegie Steel Company's plant at Beaver Falls, Pa., was started up on the 15th inst.

On December 1st the West Superior Blast Furnace starts up. Its product, which is about 125 tons daily, will be consumed by the Superior Steel Company, of West Superior.

A heavy shock of earthquake was felt in San Francisco, Cal., on the 13th inst., and also at various points throughout California. No damage was done beyond the breaking of glass.

The iron and steel manufacturing company of Cannonsburg, Pa., which has been making arrangements to start in connection with their mill the manufacture of tin plate, has abandoned the project.

The large nail mill at Georgetown, Pa., which has been idle for several years, has been leased by several Pittsburg manufacturers, and will be put in operation at once. It will employ about 600 men and boys.

A ninety-mile pipe line is now being built from Waukesha, Wis., to Chicago, to carry to the Windy City a supply of Waukesha's celebrated medicinal spring waters. This represents the consumption of many tons of iron.

In the Southern States there have been established during the first nine months of 1892, 99 new iron and steel industrial works divided as follows: 2 furnaces, 3 stove works, 68 foundries and machine shops and 36 miscellaneous iron and steel works.

A telegram from Phoenixville, Pa., on the 12th inst. says that the night turn on two mills of the Phoenix Iron Works has been taken off, and this will be followed by a general reduction of the force all over the works shortly. A lack of orders is ascribed as the cause.

The Executive Committee of the Amalgamated Steel and Iron Association, and the strikers in the Carnegie mills at Beaver Falls, Lawrenceville and Homestead, Pa., held a conference in Pittsburg, Pa., on the 14th inst., and discussed the strike situation. No definite action was decided upon.

The Commercial Electric Co., of Indianapolis, a new company just started for the manufacture of dynamos and motors, have placed their contract for the equipment of their works with The Lodge & Davis Machine Tool Co., of Cincinnati, for their improved lathes, planers, shapers, drill presses, milling machines, etc.

It is reported that preparations are being made to resume operations at the Carnegie Mills at Beaver Falls, Pa. Applications have been received from many of the old men for their former positions. Superintendent Wrigley states that over 500 men have been engaged to go to work. No trouble with the strikers is anticipated.

At a meeting of the Western Flint Bottle Manufacturers' Association in Pittsburg, Pa., on the 16th inst., at which 90% of the capacity of the Western District was represented, it was unanimously agreed "to withdraw all prices and shut down the factories for two weeks between the 15th of December and the 1st of February, to be selected by the members."

The New Glasgow Iron, Coal and Ry. Co., Ferrona, Pictou Co., Nova Scotia, is to increase its coal washing plant from 180 to 300 tons daily capacity. Eighteen new retort coke ovens (Bernard System) will also be built. Walker M. Stein,

Philadelphia, has charge of the work, having just completed the coal washing plant of the Standard Coal Co., Brookwood, Ala.

The Lobdell Car Wheel Company, of Wilmington, Del., have placed the contract for their new machine shop with The Berlin Iron Bridge Company, of East Berlin, Conn. The building will be 67 ft. in width, divided into a central portion 25 ft. in width, with a wing on each side 21 ft. in width. The central portion is controlled by a 15-ton traveling crane. The building will be 151 ft. long, the entire framework being of iron, the side walls being of brick.

The railroad from Pueblo to Oajaca is completed. The length is 367 kilometers. The earthworks constructed measured 3,000,000 cubic feet, of which 2,000,000 ft. is rock and 110,000 is solid masonry. The people of Oajaca enthusiastically received President Diaz, who was born here and is an ex-Governor of the State. All believe that the railroad opens an era of prosperity for the whole of Southern Mexico. The State of Oajaca is rich in gold, but has never been properly developed owing to the lack of communication.

A magazine containing 166 lbs. of dynamite, near the main wheel pit of the Cataract Construction Company's tunnel, at Niagara Falls, N. Y., exploded on the 12th inst. A machinist was instantly killed, and several other workmen were injured. The concussion was sufficient to demolish several adjacent buildings, and to smash a large amount of window glass. The explosion was caused by a fire in the powder house, and most of the workmen heard the alarm and fled precipitately, thus saving their lives.

The officers of the new company will be: M. Mosler, president; W. W. Clark and Thomas Barnes, vice-presidents; Herman Urban, president of the Macneale & Urban Safe and Lock Company, secretary; and George L. Damon, treasurer. Those who have organized the combination consider it one of the most important mercantile companies yet organized, and in conjunction with the Herring-Hall-Marvin Company, which was formed last spring, it will control practically the entire safe manufacturing industry of the United States. It is understood that the two corporations will be operated in harmony.

The Diebold-Mosler-Damon Safe Company, a consolidation of 11 principal companies and firms who manufacture fire and burglar-proof vaults and safes, was incorporated on the 15th inst., at Trenton, N. J., with a capital of \$5,000,000, of which \$2,800,000 will be preferred stock and \$2,200,000 common stock. The properties taken over by the new corporation have factories in New York, Massachusetts, Pennsylvania, Maryland and Ohio, and branches throughout the country. The new company is empowered to carry on business in all States in Central and South America and in Europe.

H. C. Frick, Chairman of the Carnegie Steel Company, was at the Navy Department Nov. 15, by appointment, to discuss with Secretary Tracy the matter of steel deliveries for naval construction. Much, if not all, of the delay in the completion of the new naval vessels has been caused by the fact that steel of the peculiar quality required for armor has not been delivered in sufficient quantity to keep pace with the construction. The coast-defense vessel Monterey, now lying at the Union Iron Works yard in California, has been practically complete, except as to armor, for many months, and the contractors have been pressing to have her accepted by the Navy Department. There is need for the vessel in the service, too, in order to release some of the vessels now at the Mare Island Navy Yard for foreign service—at Samoa and Honolulu, for instance. Finally, it has been decided that she shall go into commission Jan. 10 next, whether the armor is complete or not, and it is said that the turrets will be lacking on that date. This state of affairs is naturally disagreeable to the Department, so Secretary Tracy has been endeavoring to hasten the deliveries of steel, and to this end he saw Mr. Frick.

The franchise for the construction of the proposed rapid transit railroads in New York will be offered for sale in the rotunda of the City Hall, at 12 o'clock, on December 28th, by Eugene L. Bushe, one of the Rapid Transit Commissioners.

The terms of sale and the full specifications of the proposed road, which naturally has attracted so much attention in this city during the last six months, were made public at a meeting of the Commissioners, held yesterday afternoon. They fill a good-sized pamphlet of forty-three pages. The purchaser, or purchasers, will have the "right, privilege and franchise to construct, maintain and operate" the railway for a period of 999 years. The route, beginning at the Battery to the city limits, with the various loops and branches, has already been described in the Engineering and Mining Journal. The purchasers will be required to pay to the auctioneer, for the benefit of the city at the time and place of the sale, 10% of the amount of money bid. They will also be obliged to deposit the sum of \$1,000,000, in cash or securities, to be approved by the board, as a guarantee of good faith, within five days after notice of the acceptance of the bid has been sent to their address. The remaining 90% of the amount bid at

the sale is to be paid to the Controller within thirty days after the acceptance of the bid.

In addition to these sums, the purchasers must also pay within thirty days \$89,247.15, with interest from November 12th, 1892, the amount of expenses incurred by the Commissioners since their appointment.

The purchasers are to organize, within two months after the acceptance of the bid, a corporation to enjoy the privileges of the franchise and to construct the railway. The company is to have a capital stock of \$50,000,000, and is to be authorized to issue 500,000 shares of the par value of \$100 each. The subscribers to the shares are to pay 5% cash. The maximum amount of the bonded indebtedness, which the company is to be allowed to incur, is to be \$50,000,000. This amount may be secured by a mortgage upon the property and franchises. The maximum fare for a traveler over any part of the road is to be 5 cents, and maximum fare is to be 20 cents a ton per mile in carload lots. For less than carload lots, the maximum fare is to be 5 cents a hundred pounds. No single package, however, will be carried for less than 25 cents. The work of constructing the railway is to be under the supervision of the board and subject to the approval of its engineers. Before beginning work, the corporation is to execute and deliver to the Mayor, a bond of obligation for \$2,000,000, with sufficient sureties, and be liable for all damages to property and persons.

The railway is to be exempt from taxation during the work of construction. The corporation is to carry the United States mails, at rates to be fixed later. The \$1,000,000 deposited with the Controller as a guarantee is to be held until the road is finished.

The motive power of the proposed railway is to be "by the power or force of electricity or some other power not requiring combustion within the tunnel." The motor used must be large enough to start easily a train of eight cars, each weighing, in addition to its load of passengers, not less than 30,000 lbs., and to maintain a speed of not less than 40 miles an hour.

MACHINERY AND SUPPLIES WANTED AT HOME AND ABROAD.

If any one wanting machinery or supplies of any kind will notify the Engineering and Mining Journal of what he needs, his "Want" will be published in this column, and his address will be furnished to any one desiring to supply him.

Any one wishing to communicate with the parties whose wants are given in this column can obtain their address at this office.

No charge will be made for these services.

We also offer our services to foreign correspondents who desire to purchase American goods, and shall be pleased to furnish them information concerning goods of any kind, and forward them catalogues and discounts of manufacturers in each line, thus enabling the purchaser to select the most suitable articles before ordering.

All these services are rendered gratuitously in the interest of our subscribers and advertisers; the proprietors of the Engineering and Mining Journal are not brokers or exporters, nor have they any pecuniary interest in buying or selling of goods of any kind.

Goods Wanted at Home.

2,824. 1½ to 3 miles of new 40-lb. T rails, or good 50 or 56 lb. second-hand. Georgia.

2,825. A light gang edger; one that will cut from 10,000 to 15,000 per day. West Virginia.

2,826. Rope machinery; also an outfit for making No. 5 cotton yarns; capacity 2,000 lbs. per day. Georgia.

2,827. A saw for splitting siding; also a swing cut-off saw and one for making lathes. West Virginia.

2,828. Machinery to equip a first-class wood working establishment. Alabama.

2,829. Catalogue and price list on prospecting drills, to drill up to 100 ft. in boulder ground; not over 3 in. bit, hand, steam or horse power. Light, compact and portable. Missouri.

2,830. Machinery for canning factory, for manufacturing excelsior, for making handles; also saw mill machinery. Georgia.

2,831. A 60 H. P. 6-in. flue boiler, a nigger standard bar, a chain (9) live rolls, complete; a steam feed for cut-off saw; a slab slasher; 20 pair trucks, (with axles), 16-in wheels, journals on outside, for dry kiln, and cars. Mississippi.

2,832. Mine cars, steel T rails, and wire ropes. Virginia.

2,833. A small 4 side molder and matcher, 18-22 in. resaw, belting, 50 H. P. boiler and pump, and heater. Louisiana.

2,834. A 70-in. x 40-in. x 6 15-16. split iron pulley, heavy for 3 ply belt. Pennsylvania.

GENERAL MINING NEWS.

ALASKA.

Cash Mine.—This mine was formerly known as the Stewart, extensively worked some 14 years ago. Mismanagement was then the cause of the works being abandoned. Since that time the treatment of ores bearing precious metal has advanced so

much that it is thought that even the working over of the old tailings will yield profitable results. To obtain a test of the value of the ore and the tailings respectively, a shipment is now made.

New Archangel and Thetis.—The mines are situated at the headwaters of the east fork of Indian River. Both lodes look well and show quantities of galena and sulphurets. The vein of the New Archangel is 30 ft. wide, and that of the Thetis 16 ft. The average assay of both lodes is about the same, showing 28 oz. in silver and \$4.60 in gold per ton.

ARIZONA.

The following mining companies report having had balances on hand November 1st.: Silver King, \$719.85; Crocker, \$2,569.57; Peer, \$1,457.28; Peerless, \$3,246.01; Coptis, \$4,000.

Gila County.

Commercial Mining Company.—The Globe "Silver Belt" learns from Mr. Oates, superintending the development of a number of claims for this company, that he has a good showing in the Ingot and Nevada. Considerable work has been done on the Ingot and in the main drift a large body of good copper ore was encountered and has been followed for about 70 ft. The ore body is, apparently doubling back and will be found to parallel the main drift, from which a cross cut will be run to intersect it. The Nevada claim is not so well opened as the Ingot. The shaft is in ore for a depth of 75 ft.

Pima County.

Canada del Oro Company.—According to the Tucson "Citizen," the Canada del Oro smelter is running right along and making such improvements as justify a permanency.

Pinal County.

Casa Grande Gold and Silver Mining Company.—The scheme to consolidate the Central silver mines with others under the name of the Casa Grande Gold and Silver Mining Company has been completed, says the St. Louis "Republic," and the new organization elected a board of directors consisting of 11 business men of St. Louis, Mo., as follows: L. H. Conn, I. W. Wallace, W. G. McRice, Chas. H. Peck, Thos. Rankin, Jr., C. W. Bullen, Albert Frankenthal, John C. Loss, J. H. Lewis, W. C. Wrisberg and John P. Keiser. The plan of reorganization and consolidation is briefly as follows: The new company is to have a capital stock of 1,000,000 shares of a par value of \$10 each, and they propose to purchase the North Star, Central Silver and Christmas Gift mines—all of which are to be consolidated and worked under the name of Casa Grande. For the Central Silver they are to give 600,000 shares of the capital stock, 400,000 of which is to be full paid up and 200,000 to be paid up to the extent of \$9.75 per share. A similar proposition has been made and accepted by the North Star, except that the owners are to receive 400,000 shares, 300,000 of which are full paid and the balance paid to the extent of \$9.75. The stockholders of the Central Silver are to be given 30 days to exchange two shares of the old stock for one of the new assessable treasury stock, provided they pay into the treasury at the time of exchange 2 cts. per share on all stock received by them. The said 2 cts. is to be credited as part payment of the 25 cts. per share due on stock, the remainder to be paid in monthly assessments of 1 ct. per share. The 700,000 shares of the paid-up stock is to be pooled for 18 months, and the owners of the full paid-up stock of the company are to have the privilege for 15 days of taking all of the treasury stock not taken by the Central Silver stockholders. The above proposition, which has been accepted by the trustees of the bondholders of the Central Silver, makes the Casa Grande the owners of seven mining claims, the Horn Silver, Gray Eagle and Silver Reef, with smelter, hoisting plant, etc., of the Central Silver; the North Star, Montezuma and mill site of the North Star and the Christmas Gift.

CALIFORNIA.

Amador County.

The "Amador Ledger" says: "The mining interests around Plymouth are starting up again. San Francisco parties have taken hold of the Osceola mine and are ready to let a contract to run a 300-ft. tunnel. T. Bawden's claim south of the Bay State has been bonded by Dr. Boyson, who intends to sink a shaft and thoroughly prospect the ledge. The first shipment of bullion from the Bay State mine was made on October 25th. Three hundred tons of rock crushed in the Plymouth mill returned \$1,913 in gold, and yielded five tons of sulphurets, which produced \$421, making the rock average \$7.78 per ton. A contract has been let to Knight & Co., of Sutter Creek, for a hydraulic engine and pump with a capacity of 300,000 gallons in 24 hours. Work on the plant is being pushed ahead as fast as possible, and when complete, sinking and drifting will be inaugurated.

During October quicksilver produced at the mines was shipped from Calistoga as follows: Napa Con. mine, 575; Great Western, 500; Mirabel, 384; Sulphur Bank, 125. Total for month, 1,584.

(From our Special Correspondent.)

Bay State Mining Company, Plymouth.—Several improvements are being made at the mine; among others a new pump will be put in, when work will be extended. A run of the mill on 250 tons of ore has yielded slightly over \$9 per ton.

Butte County.

(From our Special Correspondent.)

The mining region about Oroville, Bangor and Forbestown, in Butte county, was for many years one of the most prominent in California. The stoppage of hydraulic mining and the silver excitement in other sections of the country, put almost an end to mining here. The last year has witnessed a great change. Forbestown is in the foot hill district, having an altitude of over 2,000 ft. W. W. Stow, one of California's leading capitalists, and Alvinza Hayward, one of her successful miners, each invested in mining property and put large numbers of men at work. Mr. Stow erected after a time a 20-stamp quartz mill which proved so successful that he has added to it a second mill of 20 stamps. A force of from 40 to 50 men are employed, and the rock, it is said, grows richer as the lode is sunk upon. The latest and most improved machinery has been placed in the mill. Mr. Hayward, in what is known as the Shakespear mine, sunk a shaft 500 ft. deep and has made extensive developments before putting up any reduction works. He is now putting in a new and powerful hoisting works and has almost completed chlorination works that cost \$30,000. They will begin working ore some time this month. The success of the Gold Bank, as Mr. Stow's mine is named, has led other capitalists to investigate the mines of the vicinity. Considerable property has lately changed hands and Forbestown has become one of the most thriving mining towns in the state. Twenty-five years ago the town of Bangor was a prosperous mining camp. The placer mines gave out and there was no satisfactory way of working the blue gravel. Within the past 12 months seven companies have been organized for working these gravels. The gravel is now ground in an arrastra or run through a quartz mill. It averages from \$8 to \$10 per day to each miner engaged in underground work. During the past year about 200 miners have been given employment and all the mines are doing well. The town has rapidly revived. Sixteen new buildings have been erected, and the saloons, stores and restaurants indicate a return to the days when gold was very plentiful in the mining camps of California. It is thought this gravel extends for a number of miles, as it is supposed to be the channel of an ancient river. Well posted miners assert that the beds will last for fifty years.

In the Brown's Hill region, which is somewhat higher in the mountains than Forbestown, Wheeler Brothers are taking out gravel that pays from \$7 to \$15 per car load. Paul Willett has developed a very rich quartz lode and is now working with Mr. Richardson, a profitable gravel mine. The Cascade gravel mine owned by D. K. Perkins and W. S. Higgins, of Oroville, and the Wilcox Brothers, of Honolulu, is proving rich. It took over seven years to open and develop this mine, but rich gravel has been found at last. Near Brown's Hill, Wolters Brothers, of Gibsonville, have for five years been running a 700-ft. tunnel to tap a quartz lode. They struck the ledge and found good ore. They have sunk upon this 300 ft. and have an extensive and valuable property. The tunnel was one of the costliest in the state to run, as the rock was very hard, and during a portion of the time less than 6 ins. per day was run. They have an excellent mill that will begin crushing quartz next Monday. Colonel McLaughlin in company with New York capitalists, is sinking a 500-ft. shaft on the Banner quartz mine, and the foreman informs the writer that the mine is looking exceedingly well. The recent decision of Judge Gilbert on the mining question has awakened much enthusiasm among miners, and all predict a speedy revival of hydraulic mining in the Sierras.

Mono County.

The following Bodie mining companies have filed statements showing financial condition on November 1st: Cash on hand: Bodie Consolidated, \$11,187.27; Mono, \$11,086.91; Bulwer Consolidated, \$11,086.91; Standard Consolidated, \$34,136.60, not including \$23,236.28 in bullion since received; Syndicate, \$1,291.97. Indebtedness, Summit, \$1,975.43.

Nevada County.

(From our Special Correspondent.)

Delhi Mining Company, Columbus Hill.—The property of this company, which has not been particularly productive for some time is, if report speaks truly, about to take a new lease of prosperity. A big lead, the ore from which averages from \$25 to \$35 per ton, has been uncovered 1,000 ft. in from the 1,500 tunnel mouth when the company sank 30 ft. Hoisting and pumping machinery are to be put into the tunnel and the shaft sunk 150 ft. when drifting will commence. The ore from the ledge discovered is said to be similar in character to that heretofore found in other parts of the mine which yielded high in sulphates.

Placer County.

Mayflower Gravel Mining Company.—A shipment of bullion valued at \$10,000 was received at the San Francisco office of this company last week.

(From our Special Correspondent.)

Mayflower Gravel Mining Company, Forest Hill.—Another shipment of bullion, valued at \$10,000, has been made from this mine.

Plumas County.

(From our Special Correspondent.)

Considerable outside money is being invested in

the mines of this county, and good returns are being made from many of the minor properties throughout the district. The Crescent mill of 30 stamps is running night and day on excellent ore. A company is being organized to work a very promising property at Genesee Valley, where a new mill will be erected. There is water power of 350 metres in the dry season, and with modern appliances an excellent showing can be made.

San Bernardino County.

(From our Special Correspondent.)

San Jacinto Estate, Temescal.—The dispatch received telling of the determination arrived at the meeting of the stockholders in London to increase the capital stock by \$200,000, and to prevent the property passing into the hands of the debenture holders, has inspired hope that the mines may soon be again in full operation. The recent experting of the mines which has been satisfactory in every way has revived the hopes of those who were overborne by the persistent reports set in circulation that the ore was only found in pockets. Mr. Varcoe, who inspected the property, declared that it was a true fissure vein and gave it as his opinion that tin would appear in large and paying quantities if a depth of 20 fathoms was reached. To develop the mine to this extent will cost about \$50,000.

San Diego County.

(From our Special Correspondent.)

Dr. Eames, who was promised a subsidy of \$200,000 if he succeeded in establishing a reduction works at San Diego, but who, through a combination of circumstances, failed in his efforts, has another scheme afoot. He has formed a syndicate in Pittsburg to undertake a similar enterprise at Roseville, on San Diego Bay. Ore from Lower California will be used, and as the product has been passed upon by experts and pronounced equal to the best found in Great Britain, so far, the outlook is promising. The company propose leasing oil lands in Ventura County, the crude oil to be transported in barges.

COLORADO.

The Rio Grande Railroad is building a line from Crested Butte, through Irwin, over Ohio Pass to the coal lands owned by the Colorado Fuel & Iron Company, a distance of 11 miles from the terminus of the Crested Butte branch. The Fuel company owns considerable land in that vicinity and is making arrangements for extensive development. The Union Pacific also owns considerable coal land in the same vicinity, adjoining the land mentioned, says the Denver "Times," and that company has a right of way secured and the line located up Ohio Creek. The Union Pacific would have to build 16 miles, four miles further than the Rio Grande, but the latter has to run across land owned by the Union Pacific. It cannot be discovered, says the "Times," how the Union Pacific can accomplish anything, for the coal from its Baldwin mines is hauled to Gunnison, and there transferred to the Rio Grande. Its Alpine branch can not be operated to a profit and has been shut down for two years or more.

El Paso County.

Buena Vista Mining Company and Bull Mountain Mining Company.—According to the Colorado Springs "Gazette" these companies have been consolidated. Mr. J. J. Hagerman, has bought a controlling interest and will assume the management and presidency of the new company. The company will be capitalized for \$2,500,000. It has not yet been named. The other officers have not yet been selected, but it is believed that the board will consist of Messrs. J. J. Hagerman, Percy Hagerman, Count James Pourtales, Thos. C. Parrish and Wm. P. Bonbright. The properties were examined for Mr. Hagerman by Col. W. E. Newberry, of Aspen, and Mr. Benjamin Lawrence, of Denver. It is understood that their report was favorable. Count Pourtales is the President of both Bull Mountain and Buena Vista. The terms of the consolidation are that holders of Buena Vista surrender 45% of their stock and will receive 550 shares of new stock therefor for every 1,000 of the old, making 450 shares of old stock equal 550 shares of the new. Holders of Bull Mountain surrender 65% of their stock, receiving 350 shares in the new company for every 1,000 they hold of the old, making 650 Bull Mountain equal 350 shares of new stock. Under the arrangement with Mr. Hagerman, the holders of the bonds upon the properties are to be paid and the numerous claims will be held by the consolidated company absolutely free and clear of incumbrances. The debts are all paid and there is a surplus of \$20,000 in the treasury. The Buena Vista property is a well developed mine, having, it is stated, \$150,000 of ore in sight. The Lee claim has a vein even richer and larger than the Buena Vista. The Buena Vista has been continually worked until it has now four levels and a shaft 250 ft. deep. Shipping will probably not be commenced until the railroad gets in the camp.

Gunnison County.

The White Pine "Cone" says: "At Gunnison, on the 10th inst., the May-Mazeppa mine was sold under trust deed, and was bid in by the North Star Gold and Silver Mining and Milling Company; consideration, \$32,000. The officers of the new company are Chas. F. Wilson, president; B. N. Bree-man, vice-president; W. H. Malone, treasurer; Geo. F. Bachelder, Secretary. Principal office of the company at Denver. John B. Turner, who had

a lease on the mines, was granted a new lease, and the management of the property will remain the same.

San Miguel County.

Shipments of ore and concentrates from Telluride for the week ending November 11th: Smuggler-Union, 506 tons; Sheridan Consolidated, 836 tons; Hector Mining Company, 33 tons; Clara, 11 tons; Montana, 33 tons; Total for the week, 1,427 tons. Since January 1st, 30,042 tons.

Belmont Consolidated Gold Mining Company.—The Belmont mill is again running steadily, and will keep at work as long as Marshall Creek can furnish sufficient water.

Smuggler-Union Mining Company.—According to the Telluride "Republican," 35 miners were laid off by this company last week owing to the lack of open ground in which to work the full force. With the completion of the Smuggler and Union shafts, and the Bulliun tunnel, work on all three of which is being pushed as rapidly as is possible, ground will be opened for the employment of more men than have ever yet been employed on the property.

GEORGIA.

Polk County.

Cherokee Iron Company.—This company's property is located at and near Cedar Town, and consists of a coke furnace and about 300 acres of mineral land. The company was founded by the late A. G. West, who for several years operated the furnace, procuring the ore from the company's banks at Grady, about 5 miles from Cedar Town, where he worked convicts, but for some time past and previous to his death the furnace has been out of blast. The mining operations and shipment of washed ore to South Pittsburg is still carried on at Grady by the company, but free labor has been substituted for convict, for the reasons that it is found to be more profitable and reliable. Mr. West purchased the Grady property consisting of 200 acres some twenty years since, before much interest had been given to Southern iron ore properties. The story is narrated that when he made the purchase the original owner supposed he was buying the land for agricultural purposes, and told him that the soil was good, but too rocky to suit him for farming. Soon afterward he realized that Mr. West bought for the value in the rocks as he called the lumps of brown ore scattered over the surface. Developments have proven how good Mr. West's judgment was, for almost the entire 200 acres is covered with deposits of brown ore, which as shipped from the washer and analyzed at the furnace shows from 51 to 53% metallic iron. This showing is from the gravel deposits, which cover about one-half the property, and on which a double wooden log washer of the old style was erected. The water supply is furnished by three wells, connected by pipes, located about half a mile distant from the washer. The entire plant I should judge did not cost to exceed \$2,000, yet an average of 100 tons of ore per day is shipped; and to prove what results will accrue from economical management with a good mine for a foundation, I was informed by Mr. Henry S. Scott, the foreman at the mine, that his pay roll rarely exceeded \$28 per day and he had not used over 20 kegs of powder during the past six months. The balance of the company's property here is of a more solid formation, while the ore carries more rough stuff, and is high in phosphorus. On this portion of the property there are several thousands of tons of lump ore piled up on the dumps, being the results of the last workings of the banks by convict labor. The openings all show a good supply of ore still left in the banks and the floors of the cuts are ore, but to what depth has never been determined. On the gravel formation, where work is now being carried on, two cuts have been driven into the hillside until the faces are about 40 ft. high and nearly 100 ft. wide with good wash gravel from the surface to the floor, which Mr. Scott assured me had been tested in places, which showed the continuance of the same grade of gravel to an undetermined depth. Of course clay horses are encountered in these depths as is always the case in the brown ore region in the South; but I noticed that, contrary to the usual custom, here all clay was removed from the mines as work progressed, the usual custom being, as the superintendent at one mine I visited some time since, informed me, to leave all the clay in the bank as you encountered it, for mining could not be profitably conducted if the clay was removed. He was working a leased bank though.

Cochran Ore Company.—The property of this company is located about 12 miles in a northeasterly direction from Cedar Town and within a short distance of the dividing line between Polk and Floyd counties. Here I found Col. W. C. Amos, general manager, who for some years managed the property of the Tecumseh Iron Company, in Cherokee County, Ala. To use his own words: "I have the most complete plant for washing ore, and one of the best brown ore properties but no water." On examination I found this correct. The washer is a McLanahan & Stone complete, including jigs, which have recently been attached; the jig attachment costing \$2,275, while the washer, including Triumph engine and 40-H. P. boiler cost \$7,800. A pumping station has been built about half a mile distant with the apparent intention of obtaining

water from a ravine, but except during a very wet season this source is entirely insufficient. To remedy this the Colonel is now asking the stockholders to subscribe \$3,500 to enable him to change the pumping station to Wardell's Spring, and to purchase pipe and lay it from the spring to the washer, a distance of 1 1/4 miles. In justice to Colonel Amos it is only right to say that the pumping station was built prior to his administration. The ore deposit lies in a hill of about 40 acres in extent, into the side of which seven openings have been driven to ore in each one. From the locations of six of these openings they should eventually, judging from the surface indications, connect and expose a body of ore of vast extent, while the seventh opening has been driven into the hill in a direction nearly at a right angle to the other six, exposing another and apparent distinct deposit. At present these cuts are separated from each other by clay or rock, and exposing the lead of ore as was expected by the surface indications. A large amount of money has been expended in the past in digging test trenches, but an examination fails to show the expediency of this work, because the surface indications locate the lead of ore so distinctly, and in mining brown ore there is not sufficient value in the product to allow of great outlays for prospecting purposes, especially when, as in this instance, the prospecting work has been abandoned as entirely useless for working purposes. The development work, which has only recently been commenced, so far performed is good and ore can to-day be mined at each opening and sent to the washer, the tram tracks having been laid with good switch service. Up to date this property has only produced in round figures about 600 tons of ore, but with a good water supply in the future it ought to rank with the best producers in this section; the ore being of good grade for coke furnaces but too high in phosphorus for charcoal iron. The jig attachment to the washer was necessary because of the presence of slate associated with some of the ore in the bank, but this is entirely eliminated after passing over the jigs. The formation of the ore becomes more solid as work progresses into the hill and the face of ore becomes greater in height.

IDAHO.

Alturas County.

Star.—The strike reported in the Star mine is richer than was anticipated. It is said an average of the face of the drift assayed at first only 24 and 8-10th oz. silver per ton. This was not very encouraging, although the ore-body or shoot was shown to be fully 4 1/2 ft. wide. This morning, however, it is much better, a sample having assayed 478 ozs. silver and 53% lead. The width and extent of the new strike are still unascertained.

Kootenai County.

A car load of ore is being sacked for shipment from the Keystone mine. The ore will run as high as 1,800 oz. per ton. It is gray copper. The mine is located on Black Tail Mountain, about 12 miles south of Hope. The Black Jack has a shaft sunk 100 ft., besides a great deal of work done on it in the shape of drifts and cross-cuts. The lead shows a width of 12 ft., but the streak is perhaps not over five inches. Selected ore from this vein will assay 2,600 oz. There is on the dump nearly a car load of high grade ore for shipment. The shaft on the Blue is down about 60 ft. on a ledge of five feet. The pay streak is four inches in width, assaying \$800 to the ton. The Silver Wave and Muldoon are in the same vicinity and of equally high grade ore.

Lemhi County.

Two new stamp mills will be erected on Salmon River, below Salmon City. The company owning the War Eagle group have all of their arrangements for the building of a large mill completed, while the Comet Company are negotiating for a second-hand mill, with five stamp and Frue vauvers, so as to be able to work different classes of ore. On the North Fork of Salmon River, C. H. Sage, of Denver, has purchased 900 acres of placer ground, and will open up an important district. He gave \$25,000 for the property. The famous Bird gold mine is under bond to G. Wentz, W. Davis, and Messrs. McNab & Long, who expect to be in possession of the property in time to commence operations this fall.

Owyhee County.

De Lamar Mining Company, Limited.—From the manager's monthly report for September, we learn that the mill has worked satisfactorily and with but few stoppages. There were crushed 2,408 wet tons and 2,175 dry tons. The assay value of the pulp was \$38.94, of which \$19.06 was gold and \$19.86 was silver. The total percentage saved, \$4.18%. The product was as follows: Dore bars, 27; pure gold, 1,507 oz.; fine silver, 37,551 oz.; Value of the gold produced, \$30,151.77; value of the silver produced, \$30,141; surplus on bullion sold, \$1,827.06; total value, \$62,019.83; proceeds of 32 tons of ore shipped during the month, \$13,600; miscellaneous receipts, \$521.81; total receipts, \$76,141.64; expenses for the month, \$35,913.12; estimated profit for the month, \$40,228.52.

Trade Dollar.—Drifting is going on on the 100-ft. level of the Trade Dollar mine at Silver City. A steam hoisting plant has been ordered and is now on the way. It will be placed in No. 3 tunnel to sink winze D to connect with the Blaine tunnel

below. The returns from the last car of ore shipped are as follows: 21,573 lbs.—gold 572 ozs., silver 1,024 ozs.—total value of car, \$9,828; net value, \$8,692. Another car load will be shipped in a few days. The new mill will be ready to commence crushing inside of a week.

Shoshone County.

General Curtis, commanding the troops in Coeur d'Alene Mines, Idaho, has been directed to suspend martial law in Shoshone County. The county has been under martial law since last June. The Federal troops have been ordered withdrawn and now the civil authorities will resume control.

ILLINOIS.

Sangamon County.

The coal miners of the Springfield sub-district met on the 15th inst. and formulated a scale of 45 cts. a ton gross weight and \$2.25 a keg for powder, coupled with a demand for weekly pay. If this scale is not accepted within a week's time by the operators a general strike will be ordered.

KENTUCKY.

Bell County.

The statement is again made that the unfinished plant of the Watts Iron and Steel Company, at Middlesborough, Ky., will soon be completed. It is said that the plant already cost \$1,800,000, and that the \$200,000 necessary to complete the work has been raised.

MICHIGAN.

Copper.

Franklin Mining Company.—A breakage of the main shaft of the hoisting engine at the Franklin, on the 7th November, caused an interruption of work for a whole week. The mine was compelled to shut down entirely.

Mamaine Copper.—Captain Trethewey's explorations near Mamaine, Lake Superior, have been very successful. A company of American gentlemen, led by Mr. Sibley, of Detroit, subscribed \$10,000 for the explorations, and the result is so satisfactory that a further \$30,000 has been raised to work the veins. Capt. Trethewey and Mr. Sibley went to Sherbrooke last week and bought \$6,000 worth of mining machinery. Captain Trethewey will take a gang of men and materials and put up the requisite buildings for housing the plant, and the men, for which he appropriates \$2,000. All is to be ready to start in the first week of 1893.

Quincy Mining Company.—The Quincy reports a product for October of 700 tons 680 lbs., against an average of about 500 tons for several months previous. This increase is the result of active work at the North Quincy, and a further increase may be looked for. The fourth new stamp head in the Quincy mill has been going less than a month. The fifth head is about ready for work. At the mine preparation is going forward with all speed to turn out the required amount of rock to keep the five heads in constant operation.

Iron.

With lake navigation nearing a close, it is now evident that iron ore shipments from the Lake Superior region for 1892 will be about 9,000,000 gross tons, and it is estimated that shipments next season from the new Mesaba iron range of Minnesota will cause a total movement in 1893 of 13,000,000 tons. Forty-nine new vessels, valued at \$6,909,505, are now being built in lake shipyards to care for this increased traffic, and at Cleveland and other ports on Lake Erie the railway and dock companies are preparing to expend large sums of money for improvements in dock facilities. At Conneaut, Ohio, a new port has been opened and \$300,000 expended in ore and coal docks which are connected with the iron and coal districts in the vicinity of Pittsburgh by the new Pittsburgh, Shenango and Lake Erie Railway. The first cargo of coal has just been delivered at these docks and it is estimated that they will handle 500,000 tons next season.

Iron—Gogebic Range.

Hamilton.—The work of getting the machinery in shape to unwater the Hamilton and Ludington mines is now progressing satisfactorily, and it is now expected that the bailing apparatus will be in operation early in December. The water will be hoisted from Hamilton No. 2, and the incline at the Ludington. At present men are engaged in moving the engine from No. 1 to No. 2 shaft at the Hamilton. It will be utilized in handling men and timber in the shaft.

Iron—Marquette Range.

Dexter Mining Company.—The shaft at the Dexter mine will be sunk to a greater depth at once. This company has found ready sale for their ore and will continue shipments all winter. One of their principal customers is the Illinois Steel Company.

Pendill.—The pumps, boilers, etc., used in the old Pendill shaft at Negaunee have been removed and the town of Negaunee is now occupied in making arrangements for covering over the mouths of disused mines within the city limits.

(From our Special Correspondent.)

Stocks are large at Lake Superior mines owing to two causes, either that unsold is low grade and high phosphorus ore, or else the owners hold it at too high a figure. Since the development of the

Menominee, the Gogebic, the Vermillion and now the Mesaba range, the product of ore has been so stimulated and increased that there is always a small surplus on hand to keep the price within bounds.

The Marquette range up to the year 1870 had full control of the ore market of this country, but people were compelled to seek elsewhere for an opportunity for speculation and development of iron bearing land. There is no doubt at all but under a liberal policy which would enable outside capitalists to gain a footing, the Marquette range alone could be made to produce much larger quantities of iron ore. Until a year ago the Lake Superior Iron Co. had mined only upon one forty acre tract, the Cleveland Iron Co. only upon an eighty, the Iron Cliffs Co. only upon three forties, while the celebrated Republic, with its rich product, embraces scarcely sixty acres, and so with many other mines. The large land holding estates of some of these iron companies retard the development of the mining industry.

The Cleveland Cliffs Company holds options of large areas of land, stipulating that the managing director will have the entire control of marketing the ore that may be mined so that at any time he can suppress interference from any one who may be fortunate enough to find a mine and try to work it upon any of this land. This company holds about 100,000 acres of the cream of the range. The Lake Superior Iron Co., also large real estate owners, give no options in the strict sense of the term, they simply allow one to explore at his own expense and if he finds anything of value and the Superintendent thinks proper, the company may develop the property, giving the discoverer a certain amount per ton, mined and sold, for a certain period, amounting altogether to \$10,000. It is owing to this that this range is developing slowly, and thus it is that other valuable ranges are opening up.

The American and East New York are both temporarily closed owing to a complicated mass of matters, chiefly made up of lack of capital, poor management and the need of better mining plants. It is thought that by spring they will again resume. Ore is present at both mines to sufficiently warrant their belief.

Saginaw.—After a sort of intermittent life since 1884, this mine has completely closed down. The pumps and other fixtures are being raised to surface and the mine will now no doubt be permanently abandoned. It has produced over half a million tons of ore; its largest output being in 1878, when it reached the sum of 56,000 tons. There are yet remaining in the mine large quantities of second class, low grade 40-55% ore, high in silica and phosphorus, which is awaiting magnetic separation. Several thousands of tons of ore remaining in stock are now being shipped.

Iron—Menominee Range.

Sheridan Iron Company.—Capt. William White, recently superintendent of the Sheridan, was at Tower, Minn., last week making arrangements to move the Sheridan mining equipment to the Mesaba range, where C. E. Shannon and others will soon commence explorations on the forty west of McKinley.

MISSOURI.

The Sixth Annual Report of the State Mine Inspector, Mr. C. C. Woodson, says of lead and zinc: In the lead and zinc industries astonishing progress has been made notwithstanding serious obstacles were encountered, especially in the southwestern portion of the State, resulting from extraordinary rains, during the spring months, which greatly delayed work. The already large output would have been much increased but for this trouble. Jasper county leads in the total value, or rather actual amount received for its product, with a total for lead and zinc of \$2,946,477.31. This county has made a large increase in both lead ore and zinc ore, the amount in excess of last year's receipts being \$334,752.81. The output of zinc amounts to 80% of the entire zinc product of the State. St. Francois county shows an increase in the production of lead ore over the preceding year, and has to its credit 48% of the entire lead ore produced in the State. The following shows the product of each county in tons of lead and zinc ores:

Counties.	Zinc.	Lead.
Jasper.....	106,014	11,501
St. Francois.....	.....	23,740
Lawrence.....	13,861	5,721
Newton.....	8,343	1,250
Madison.....	.....	4,403
Washington.....	.....	1,784
Jefferson.....	2,075	412
Greene.....	899	406
Barry.....	192	84
Franklin.....	.....	150
Dade.....	104	98
Cole.....	.....	33
Miller.....	.....	23
Perry.....	.....	7
Totals.....	131,488	49,626

The sales of the lead and zinc ores aggregated \$5,056,504.62.

Jasper County.

(From our Special Correspondent.)

Joplin, Nov. 7.

Saturday evening closed an active week in the lead and zinc mines of the entire district, and as

predicted some time ago, the zinc ore market is advancing, and the ore buyers are out for everything in sight. The market closed at \$22.50 and \$23.50 was paid for extra clean ore. Lead ore remains firm at \$21.50 per thousand. Following are the sales from the different camps: Joplin mines, 1,778,270 lbs. zinc ore and 250,790 lead, value \$24,264; Webb City Mines, 442,530 lbs. zinc ore and 53,690 lead, value \$3,780; Cartersville Mines, 2,579,150 lbs. zinc ore and 99,940 lead, value \$30,450; Zincite mines, 185,890 lbs. zinc ore and 3,480 lead, value \$1,997; Lehigh mines, 85,960 lbs. zinc ore, value \$945; Oronogo mines, 171,580 lbs. zinc ore and 69,220 lead, value \$3,160; Alba mines, 96,690 lbs. zinc ore, value \$1,063; Galena Kans mines, 1,495,780 lbs. zinc ore and 268,580 lead, value \$22,363; District's total value, \$88,022. Aurora, Lawrence County, mines, 508,410 lbs. zinc ore, 714,540 lbs. silicate and 150,000 lbs. of lead, value \$13,857. Lead and zinc belts total value, \$101,879.

MONTANA.

Deer Lodge County.

Fairstake Mining Company.—This company was organized to-day with a capitalization of 350,000 shares of a par value of \$2. A. J. Bettles, the superintendent of the Granite Mountain Mining Company's mills, was elected president; S. L. Snyder, vice-president, and J. F. Brayelton, county clerk and recorder, secretary and treasurer. The principal office is Deer Lodge. The mine is located near the Atlantic Cable and Southern Cross mines in Flint Creek mining district. Mr. Snyder will take charge as superintendent. The ore is said to be free milling and assays from \$37 to \$120 per ton in gold, the top of the shaft down 50 ft. Below 50 ft. to the bottom of the shaft, which is about 110 ft. deep, the ore is marvelously rich. The vein, as far as shown up, is from 15 to 24 in. in width. The owners have standard a tunnel and have gone in about 45 ft., the vein showing up a width of about 3 ft.

Meagher County.

Queen of the Hills.—This mine has been thoroughly and systematically developed, showing large bodies of high-grade silver ore. It is opened by tunnels and shafts, one tunnel being in over 1,000 ft. and another 250 ft. Hitherto the product of the mine has been shipped to the smelter at Great Falls; but as will be shown by what follows the ores of the mine will be treated at Neihart. It is easy of reduction and the plant which will be put in at Neihart will readily treat 100 tons per day. The fame of the mine had preceded the shipment of ore to Park City, where tests were made by the Russell process, and its treatment there was watched by various representatives of capital who since that time have made overtures looking to the purchase of the property.

Park County.

Boulder Mines.—The mining interests of this locality tributary to Big Timber are being opened up as fast as men and money can accomplish the work.

Henderson Mountain Mining and Milling Company.—Work upon the buildings for the company is progressing favorably, and that the mill will be in readiness for operation not later than December 15th. It is to be operated by the cyanide process.

Independence Mining Company.—This company has just commenced operations with its stamp mill, working on free milling gold. The first run proved to be so satisfactory that the managers decided to immediately increase their capacity to double the output.

Poorman Mining Company.—This company has a three-stamp mill in operation, which is yielding very successful results. The same company has purchased two more mills that will be put in operation immediately.

Silver Bow County.

Bluebird Mining Company, Limited.—A reorganization has been effected and the creditors of the old company have been satisfied. Pat Largey and James A. Murray have agreed to transfer their claims and dismiss their suits in consideration of 1-20 each of the capital stock. The working capital is to be \$200,000. Operations will be commenced shortly.

Boston & Montana Consolidated Copper and Silver Mining Company.—The Boston "Herald" says this company expects to close permanently the copper works at Butte next month. The Great Falls works will then probably make one-half the output. With copper at 95¢ and 93¢ cts. the company is understood to be earning all expenses, charges and sinking fund, but dividends upon the stock are not to be thought of this year or next.

Boston & Montana Consolidated Mining Company.—It is hoped that the upper works at Butte can be closed permanently next month, when it is expected, or at least hoped, that the Gt. Falls works will make one-half of the output. The upper works at Butte are old and somewhat dilapidated. The better parts may be transported to Great Falls, and the plant be generally dismantled. They would soon require extensive repairs if kept in use, and their disuse would not entail much loss.

Germania.—Frank Blodgett and others have

taken a six-months' lease on the Germania and are doing some work in various parts of the property. The shaft on the Germania is 400 ft. deep and is well timbered from top to bottom. In the past this mine has been a large producer of high grade silver ore, but of late the ore shoot seems to have been lost to a certain extent. The owners of the property, were offered \$200,000 for it at one time, but since then more than that amount has been taken from it.

Henry.—Some three months ago Messrs. Blight, Bennett & Co., secured a lease and bond on the Henry claim situated south of the Volunteer and adjoining the Great Western, across Missoula gulch. A small hoist was erected, machinery was placed on the ground and sinking was commenced. At a depth of ninety feet the ledge matter assumed a peculiar color and showed unmistakable evidences of the existence of copper ore in that locality. The shaft is now developed to the 100 ft. level, the workmen being engaged in cutting a station. The leasers are confident that they have encountered an extension of the great copper ledge which supplies the Gagnon and other producers, and claim that the ore being taken from the Henry is similar in character to that taken at the same depths from the Mountain Con and Green Mountain mines. Sinking on the ledge is still in progress and will continue until the 150-ft. level is reached. When the work of cutting the station is completed a force of men will be put to work drifting. At present some very fine specimens of silver ore are being obtained. One streak in the bottom of the shaft assayed from 200 to 700 ozs. in silver. One encouraging sign is that the lead matter is gradually growing richer as the shaft is becoming developed. The ledge on the surface is nearly 20 ft. in width, but below the walls have not yet been uncovered, so that it is impossible to ascertain its width. The leasers are confident that a large body of copper ore will be struck within 50 ft. of the 100-ft. level, and all of the mining experts who have examined the property agree with them. Their reasons for this statement are that the property is on a line with the National, and that the lead of the latter is being worked 1,700 ft. from the main shaft of the Gagnon. This would carry the lead to nearly the center of the Missoula gulch, and as it shows no sign of diminishing in quantity or quality as work is extended westward, it is presumed that the ledge does not end near that point.

Moulton Mining Company.—The Moulton company has declared dividend No. 14 amounting to 7½ cts. per share, and aggregating \$30,000.

NEVADA.

Elko County.

Following are the latest official weekly reports from the Tuscarora mines:

Navajo Mining Company.—The stopes above the 350 ft. level are about as usual. The pump has been put in order on the 350 station and pumping will be resumed during the coming week.

North Belle Isle Mining Company.—No. 1 north drift, south 300 ft. level, extending 5 ft. and connected with south drift. The stopes above this drift are producing good ore. No change in any of the other workings of the mine.

The following Tuscarora mining companies, according to statements filed on the 7th inst., report an indebtedness November 1st: Commonwealth, \$30,178.09, with \$2,500 proceeds of ore sales since received; Delmonte, \$20,799.25; Belle Isle, \$5,664.97; North Commonwealth, \$1,656.98, with \$3,000 since received from ore sales; Nevada Queen, \$14,389.82, with \$14,000 since received from sales of ore; North Belle Isle, \$10,767.52; Diana, \$248; Independence, \$57.91; Navajo, \$6,013.24. The Grand Prize Mining Company reported cash on hand \$360.12, with bills receivable of \$4,300.

An official telegram received in San Francisco on the 7th inst. announced the shipment of bullion valued at \$42,000 from the Union mill at Tuscarora for account of various mines of the district. This makes a total of \$97,000 in bullion shipped on the present run. The mill is running well and doing good work.

(From our Special Correspondent.)

To date, on the present run of the Tuscarora Union Mill, bullion valued at \$53,000 has been shipped to San Francisco for the behalf of the several companies.

Esmeralda County.

Holmes Mining Company.—This company reported having on November 1st an indebtedness of \$49,861.95, of which all except \$2,200 is due to the principal owners in England.

Eureka County.

Richmond Consolidated Mining Company.—This company's last annual report shows that the receipts were £7,148 14s. 9d. from bullion and ore sold. The furnaces were not fired during the year. The mining profit for the year was £1,734 10s. 4d., while the interest on the investment of the company was £1,298 19s. 1d. On the 28th February, 1891, there was a credit balance of £3,751 16s. 1d., out of which a dividend of 7s. per share was paid August 10th, 1891. The amount to the credit of the company on 29th February, 1892, was £2,746 1s. 2d., from which a dividend of 1s. per share has been recommended.

Storey County—Comstock Lode.

The following mining companies report having had balances on hand November 1st, 1892: Alpha Con., \$7,662.91; Alta, \$16,845.52; Andes, \$6,410.67; Best & Belcher, \$12,936.05; Caledonia, \$3,486.72; Con. New York, \$1,752.13; Chollar, \$10,722.94; Crown Point, \$2,487.97, with \$1,847.25 to be collected on the pending assessment; East Sierra Nevada, \$11.55; Exchequer, \$1,743.57; Gould & Curry, \$1,109.58; Hale & Norcross, \$17,395.84; Julia Con., \$4,729.65; Kentuck Con., \$30.70; Lady Washington, \$5,361.17; Mexican, \$1,175.49; Ophir, \$5,674.02; Scorpion, \$3,877.11; Silver Hill, \$4,082.23; Sierra Nevada, \$6,828.14; Union Con., \$14,377.09; Utah, \$330.55, with \$240.63 due the bank. The following mining companies report having an indebtedness November 1st, 1892: Bullion, \$1,711.54; Belcher, \$9,227.07; Belle Isle, \$5,664.97; Con. California and Virginia, overdraft of \$10,488.61 in Virginia City and overdraft of \$1,898 in San Francisco, with bullion to be received; Confidence, \$3,408.34; Challenge Consolidated, \$2,339.33; Consolidated Imperial, \$5,118.36; Del Monte, \$20,000; Occidental Consolidated, \$8,204.06; Overman, \$27,985.88; Potosi, \$12,409.27; Savage, \$18,963.06; Belcher, \$1,307.99.

Confidence and Challenge Consolidated Mining Companies.—The latest official weekly report says: "The joint Confidence—Challenge northwest drift on surface level is in 1,193 ft. from the Yellow Jacket shaft, the face showing quartz of no value. The west crosscut No. 6 from north drift on the same level is out 48 ft.; face shows quartz of no value. The north drift, on the 100 level, is in 1,343 ft. from the Yellow Jacket Shaft; the face shows quartz of no value. The west crosscut No. 7 on the surface level is out 16 ft., having been commenced during the week. The joint Yellow Jacket and Challenge east crosscut on the surface level is out 45 ft.; the face shows quartz of no value."

Consolidated California & Virginia Mining Co. company.—The official returns of the ore worked and bullion produced for account of the Consolidated California & Virginia mine for October show that there were worked at the Morgan mill 4,350 tons of ore, yielding bullion valued at \$70,685.09, of which \$45,776.71 was gold and \$24,908.38 was silver. The average yield in bullion per ton was \$16.24 and the average assay of the battery samples was \$22.87. The gross bullion yield for the previous month was \$78,215.45 out of 4,250 tons of ore crushed, and the average yield in bullion per ton was \$18.40, and the battery-sample average was \$22.62. During the past month, therefore, the working results were poorer all around and the company lost money—just how much has not yet been determined.

Crown Point Mining Company.—The latest official weekly letter says: "The north drift on the fourth floor of the west stope, 160 level, is advancing in ground composed chiefly of old fillings, the assays from which vary greatly, but which is considered good enough, on the average, to warrant extraction. The south drift on the floor is still following the ore streak mentioned last week, which, however, has narrowed considerably and become poorer in grade. The south stope on this level presents no change worthy of note."

Kentuck Mining Company.—The latest official weekly letter says: "For the past week the raise has been continued about the sixth floor on the 160 level, following the pay streak, which varies from 2 to 4 ft. in width, and assays from \$25 to \$30 per ton per face samples. We continue to stope on the second floor above this level, with no change of importance to report."

Savage Mining Company.—The latest official weekly letter says: "During the week we have hoisted 609 cars of ore from the 800, 950, 1,100, 1,200, 1,400 and 1,450 levels; shipped to the Nevada mill 525 tons; milled, 525 tons; average car sample assay, \$22.27; average battery assay, \$18.75. Bullion yield for the week, \$6,888. Shipped to the United States Mint at Carson, November 3d, 564 lbs. of crude bullion. The usual prospecting and repair work is being carried on throughout the mine. The joint north drift with the Gould & Curry company on the Sutro tunnel level was extended 25 ft.; face in porphyry. We have also enlarged this drift and put in a switch a distance of 60 ft. to facilitate the work in the face."

(From our Special Correspondent.)

The following is the weekly tabulated statement of ore hoisted from Comstock mines and milled, with the car and battery assays, bullion shipments, etc.:

Mine.	Tons hoisted.	Av. car sample, as y.	Tons milled.	Av. battery assay.	Bullion product for week.	Bullion shipped.
Crown Point.....	962	29.06	980	25.43	.....	\$34,130.78
Con. Cal. & Va.....	175	.....	18.20	.....	.....	4,000.00
Overman.....	225	26.07	278	17.33	.....	8,158.40
Ophir.....	25	21.50	.....	.....	.....	.....
Potosi.....	325	28.37	325	25.18	.....	.....
Savage.....	609	22.27	525	18.74	6,888.00	564 lbs.
Silver Hill.....	174	21.58	.....	16.46	.....	.....

¹Total to date on October account, \$70,685.09. ²Cars. ³Crude bullion.

The trial of the suit of Martin White vs. G. C. Hickox, J. Spear, N. B. Stone, W. Alvord and W.

Tillinghast is on trial in the Superior Court at San Francisco. The plaintiff sues to recover \$8,500 shares of stock in the Martin White Mining Company, owned by him, and turned over by Hickox & Spear, a banking firm in the Bay City, to the other defendants at the time of the firm's bankruptcy in 1878. At that time White's overdrawn account of \$14,000 and the stock were received by the other three defendants as assignees of the insolvent firm. They sold the stock without notifying the owner, and upon the plaintiff bringing suit, alleging that the stock was held by Hickox in his private capacity and not as security for the overdrawn account, he was awarded by the court \$19,000. The defendants moved for a new trial which, being granted, has brought the case again into court. Meantime Stone and Tillinghast have died, and Alvord is being sued as surviving trustee.

Sierra Nevada Mining Company.—The irremediable drift between the Cedar Hill drift and the Kenosha tunnel has been carried 95 ft., the face now being in 80-ft. porphyry. Twelve tons of fair grade ore have been saved from the drift. The west crosscut from the mine, started from north drift 800 ft. in, has now been extended to 308 ft., the face showing streaks of quartz through the porphyry.

White Pine County.

(From our Special Correspondent.)

A dispatch received at San Francisco tells of the strike in the Eberhardt tunnel, which was abandoned some years ago and work resumed within the last twelve months. The tunnel is two miles long and has absorbed an immense amount of money, but now it is likely some return will be obtained for this expenditure. The ore body is said to be extensive and 60 tons have been sent to mill as a test.

NEW MEXICO.

Grant County.

Manhattan Gold Mining and Milling Company.—This company has levied assessment No. 5, payable on or before November 15th. The Montana Tunnel, which the company is now driving, is in over 600 ft., and the manager expects to have it completed before February 1st. If a supply of water can be obtained for the company's mill at Pinos Altos, it will be removed from Silver City to that place. As soon as the tunnel is completed the cost of mining ore will be considerably less than it has been, and, if the mill be removed, the total saving in mining and transporting the ore will be about \$2 per ton.

Santa Fe County.

November 14th.—The Supreme Court of the United States has affirmed the decision of the Territorial Supreme Court in the Canyon del Agua grant case. This decision is important, and throws the important mining district open to miners. The most valuable copper mines have, however, in anticipation of such decision, been located under the U. S. mining laws and are owned by the Santa Fe Copper Company, and the Tuerto Mountain Copper Company; the valuable lead silver mines by the Lucky Lincoln Lee Company and others. The balance of the ground is of no great mineral value. (In one of our next issues, we will publish the merits of this case and the decision of the judges.)

PENNSYLVANIA.

Coal.

J. M. Staffner, of Beaver Meadow, is prospecting for coal on a track of land on Spring Mountain, between Trescow and Coleraine. The tract, it is said, has never been proved before.

There are no new developments to the proposed Spring Mountain Tunnel, which was spoken of some time ago. The tunnel is to be driven from the basin of No. 4 slope, Beaver Meadow, to Quakake Valley, thus forming an outlet for the mines on that side.

Owing to the great scarcity of cars at the collieries in this region the Pennsylvania & Reading repair shops at Palo Alto and Schuylkill Haven, which have been working full-handed, have been ordered to work double shift until further notice in order to supply the demand for cars.

The Yorktown and Jeansville collieries during the month of October worked less time than any of the other collieries on that side. The sinking of the No. 11 slope at Beaver Brook, which was abandoned some time ago on account of high water, will be resumed again in a few days. The slope is being sunk with a view of reaching the basin.

During the month of October the Morea coal breaker operated by Dodson & Co. worked 23 days, and hoisted 13,412 cars, or an average of 583 3-23 cars for each day. The colliery is now in charge of Superintendent Daniel J. Thomas and Foreman Henry Davis and Thomas G. Reese, formerly of Audenried.

It is reported that orders were received at the Tomhicken and Beaver Meadow collieries of Coxe Bros. & Co. last week to close down indefinitely. The trouble is said to be that the Philadelphia and Reading Railroad Company cannot furnish the cars. At these collieries 672 miners and laborers are employed. The rest of the firm's collieries will only work three days a week.

Indications point to an early settlement of the miners' lockout in the river districts of Western Pennsylvania. From information received from West Virginia there is reason to believe that by December 1st all the river mines will be in operation at the

old rate of 3½c. per bushel. A sure indication of an early start is the fact that several of the larger operators are beginning to get their craft ready to load.

The Honey Brook mine, at Audenried, operated by the Lehigh & Wilkes Barre Coal Company, was discovered to be on fire on the 11th inst. A force of men was at once put to work to fight the flames. The gases in the mine prevented the men from making headway. It is believed that the colliery will be totally destroyed. Arrangements for flooding the mine are being made. This will take several days, and a week or more will elapse before the water can be raised to the burning portions of the interior. In addition to the company's loss, 600 men will be thrown out of work.

William Penn colliery, owned by Pennsylvania railroad capitalists, but shipping over the Reading road, pending the completion of the Pennsylvania branch into it, shut down recently, ostensibly for want of water, but principally from inability of the Reading company to furnish empty cars. Several collieries operated by Coxe Bros. & Co. in the Lehigh region suspended operations a few days ago owing to the same cause. These, with the Lehigh Valley Coal Company's collieries above mentioned, come into direct competition with the coal of the Reading combine. The Coxe shut-down only includes collieries shipping over the Reading. Coxe is handling a very large quantity over the Pennsylvania, wherever the lines of that company can be reached directly from his collieries.

The Scranton "Tribune" publishes the following correspondence from Pottsville: "The coal mining industry is not in as prosperous a condition just now as could be desired. The Reading company complains greatly of lack of empty cars in consequence of the hockade of loaded coal cars at water shipping points and city terminal. In order to relieve the blockade and also to restrict the product that is now being placed on the market, the company is only working its best collieries full handed. Others are making as small shipments as possible without a complete shut down, while some of the more expensive places have closed down altogether. General Manager Sweigart, General Superintendent Bonzano and other prominent officials, made a thorough inspection at Schuylkill Haven, Palo Alto and St. Clair, on the 9th inst, to see wherein the company's heavy traffic could be handled to best advantage. The Blackwood colliery and the York county farm colliery, operated by the Lehigh Valley Coal Company, it is expected, will be shut down any day owing to a scarcity of empty cars. At Blackwood over 200 loaded cars are now standing awaiting removal, and nearly the same number are on the sidings at the latter colliery. One of the causes assigned is that there is too much coal stocked at Perth Amboy.

Lehigh & Wilkes Barre Coal Company.—The Honey Brook mines, now operated by this company, like the old Coleraine No. 2 slope, were considered "worked out" a quarter of a century ago. The mines are yet in operation and are remarkable for their large output. "Credit," says the Hazleton "Sentinel," "is due chiefly to D. R. Roberts," the present superintendent of the collieries at Honey Brook and Audenried.

Philadelphia & Reading Railroad Company.—The Reading suit was before Chancellor Magill of New Jersey at Trenton on the 15th inst. In the matter of the Eastern and Amboy Company, an extension of time to November 25th was granted, in which to file affidavits. In the case of the Jersey Central receivership, Attorney-General Stockton asked for additional time in which to file affidavits in reply to those filed by the company yesterday. The Attorney-General also asked the right to cross-examine Presidents McLeod and Maxwell, alleging that the answers which they had made were evasive. The Chancellor said he would render a decision in the matter of the Attorney-General's application on Friday. The final argument of the Jersey Central case is set down for Thursday, December 1st. The Attorney-General wants to argue all the cases on successive days after that date, but the companies object to this.

SOUTH DAKOTA.

Lawrence County.

Deadwood & Delaware Smelting Company.—Work is progressing rapidly at the smelter upon the addition to the works. In addition to the furnaces, enlarged dust chambers are being built.

Horseshoe.—Thomas H. White has let a contract for 100 feet additional in the two-compartment shaft on this property at Terry's peak. This will make the total depth of the shaft 232 feet, and it is expected that it will tap the ore body at that depth.

Pennington County.

Harney Peak Tin Mining, Milling and Manufacturing Company.—An exhaustive report on the tin deposits in the Black Hills owned by the Harney Peak Mining Company, made by Capt. Josiah Thomas, Superintendent of the famous Dolcoath tin mine in Cornwall, has just been made public. Capt. Thomas' report fully confirms the opinion expressed by the ENGINEERING AND MINING JOURNAL, that notwithstanding the great show of tin ore in various parts of the Black Hills region, there are grave doubts as to whether any considerable body of ore exists or whether any of the mines can be worked at a profit. In view of the extravagant

claims concerning American tin mines which have filled the daily papers, as well as many technical journals, during the past few years, this result from the careful examination of acknowledged experts is decidedly interesting. We shall publish the report next week. The value not only to this country, but to the world at large of the discovery of new and rich deposits of tin ore would be very great, for the increase in production of the metal has no more than kept pace with the increase in demand, as is shown, says *Engineering News*, by the following table, giving average prices of tin in the London market since the beginning of the century:

Year.	1800-'20	'21-'40	'41-'60	'61-'71	'72-'80	'81-'91
Cts. per lb.	16.6	15.3	23.3	26.6	26.7	19.8 25.5 19.8

Especially within the past few years has the consumption of tin shown an enormous growth and this is likely to continue for a long time to come unless the growth in demand should cause a marked increase in price. Tin and gold are about the only two metals which have not fallen heavily in "exchangeable value" in the last five decades in the face of enormous increase of demand, owing to enlargement of supply and improved metallurgical processes. For these reasons at least everyone will welcome the discovery and exploitation of really valuable deposits of tin ore in this country; but the stockjobbing and chicanery which has accompanied the prospecting of the Black Hills tin deposits has been of itself sufficient to make their actual value very doubtful.

VIRGINIA.

Augusta County.

The Rich Patch Iron Company, of Staunton, Va., has built a new dam 60 ft. wide which suffices to operate its water. The company's property, which embraces 9,000 acres, has recently been further explored, and several rich and abundant ore veins have been discovered.

Roanoke County.

The Roanoke, Va., Iron Company has put its rolling mill in operation, starting three furnaces. The plant has thirty-two furnaces with a capacity of 45 tons a turn. The remainder will be started as soon as workmen can be obtained.

The Pennsylvania Zinc and Iron Company has decided to erect a furnace during the coming winter on the property of the Columbia Land Company, west of Roanoke, Va. The work will begin about the last of January or the first of February and it is expected that the plant will be in operation in the early spring. It will have a capacity of ten tons of oxide of zinc per day, and will employ 50 or 60 men. An ore plant for washing and shipping is now nearing completion at the mines at Ivanhoe. It will soon be in operation and will have a capacity of 200 to 300 tons of ore daily.

WISCONSIN.

The shipments of ore from Ashland this year will be greater than those during 1890, when 2,174,559 tons were shipped. On the 12th inst. the tonnage for 1892 exceeded this figure, and it is expected that during the remaining week or two of the season the figures will reach 2,500,000. During 1891 only 1,253,492 tons were shipped.

FOREIGN MINING NEWS.

AUSTRALIA.

Hydraulic mining is being experimented with on a large scale in New South Wales at a place called Nelbothery, by the Delegate Hydraulic Mining Company. The gold-bearing strata here consist of beds of gravel, some 20 ft. to 30 ft. thick, which are said to show gold to the value of 2 dwt. per cu. yd. The only method of extracting this gold economically is by the hydraulic system, but the only water available lies at a lower level than the auriferous strata. The owners of the mine have therefore determined to erect powerful pumps and to pump it from a reservoir formed by damming the Little Plains River to another reservoir 300 ft. above the river, and some half a mile distant. This latter reservoir lies about 150 ft. higher than the mine and upward of a mile from it. The pumps to be used are said to be the largest yet built in Australia, and have been constructed by the Austral-Otis Engineering Company, of Melbourne. They are designed to pump 4,500,000 gallons per day. The engines are of the triple expansion type, having cylinders 10½ in., 18¾ in. and 29½ in. in diameter. The pumps are 13¾ in. in diameter, and the stroke is 21 in. Three sets are being supplied. Steam will be supplied to the engines at a pressure of 120 lbs. per sq. in. by means of four steel multitubular boilers, 16 ft. long by 6½ ft. in diameter, designed for burning wood fuel.

(From our Special Correspondent.)

The revival in the gold mining industry in Bendigo, (Victoria) continues, and during the month the following mines, in widely separated parts of the field, have appeared in the dividend list: Catherine Reef United (at Eglehawk), Great Extended Hustlers & Hustlers' Reef (in the center of the city), New Moon & South New Moon (at the extremity of the New Chum reef), the Specimen Hill (on the hill of that name out toward where the Whipstick scrub used to be in ancient times), and the Hyus (on the Garden Gully line of reef). It may not be uninteresting to give the yield of gold

from this famous old field since it was opened in October, 1851. The official list is as follows:

Year.	Ounces.	Year.	Ounces.
1851.....	200,000	1861.....	298,442
1852.....	475,857	1862.....	231,514
1853.....	661,749	1863.....	199,810
1854.....	429,983	1864.....	192,617
1855.....	451,588	1865.....	180,961
1856.....	609,729	1866.....	212,304
1857.....	492,431	1867.....	221,552
1858.....	447,712	1868.....	217,016
1859.....	403,891	1869.....	225,258
1860.....	346,603	1870.....	241,880

From 1871 the calls were contrasted with the dividends, so that the list for the past 22 years, and to the 15th of September of the present year is fuller than for the first 20 years.

Year.	Gold.	Calls.	Dividends.
	Oz.	£	£
1871.....	279,719	232,421	434,276
1872.....	360,300	360,300	683,140
1873.....	329,447	234,006	628,063
1874.....	313,965	183,884	506,615
1875.....	295,007	110,859	342,865
1876.....	275,208	104,007	404,695
1877.....	183,049	67,969	143,015
1878.....	168,990	61,182	204,325
1879.....	172,252	59,698	169,635
1880.....	172,629	83,793	214,552
1881.....	169,964	202,909	250,717
1882.....	202,269	208,260	333,472
1883.....	220,158	196,395	320,731
1884.....	219,160	154,697	318,048
1885.....	216,772	131,530	286,366
1886.....	177,546	133,721	191,321
1887.....	163,010	131,794	134,920
1888.....	174,581	172,055	178,799
1889.....	148,703	137,489	118,473
1890.....	155,091	111,142	149,381
1891.....	145,556	114,870	148,136
1892*.....	134,203	91,103	169,667

* 37 weeks.

This gives a total of 11,417,697 oz., which at £4 per oz. represents £45,670,788. But it is known that much of the gold (especially that obtained in the earlier years of the diggings) was carried away to Melbourne, Sydney, Geelong, Adelaide and other places privately by the parties who obtained it, and it is estimated that this amount exceeded 4,000,000 ozs. The total value of the gold obtained from Bendigo, therefore, may be set down at \$300,000,000. In the early years the yield was entirely from alluvial workings, and the depth did not exceed 130 ft. It was well known that the quartz reefs contained gold, and the miners amused themselves by knocking off chips, and smashing them up with hammers, but they went no further than speculating on what would be the result if they could only grind up large quantities. In 1854 Messrs. Irons & Hustler and Captain Bell fixed up a primitive sort of crushing machine, and in the following year two or three machines were at work, but they lost more gold than they saved. In 1857 Chilian mills were imported to grind up the tailings, but it was not till more than ten years afterward that the machinery was so improved as to save nearly all the gold, and since then some thousands of ounces have been obtained by running the old tailings through. The list of annual yields given above shows how the industry has fluctuated, and the developments of the past few weeks are believed to herald another good time, such as that which followed similar discoveries in 1871. What induces this opinion is that new reefs have been struck in the deep levels (from 1,800 ft. to 2,800 ft.) in a number of mines on different lines of reef. A find confined to one claim or even to one line of claims would hardly have caused the enthusiasm which exists in the quartz city, which is now said to be the only busy town in Victoria.

Queensland.—The half yearly report of the Victory Gold Mining Co., Charters Towers, shows that 4,149 tons of stone was crushed for 17,355 ozs., 12dwt. 21 gr. of gold, valued at £61,188 9s. 3d. The expenditure in opening the ground from No. 2 shaft on the Brilliant reef had been heavy, but £38,750 were paid in dividends, and the balance in hand was £6,597 10s.

New South Wales.—A new reef discovered at Sofala has created some stir in the neighborhood, but beyond the fact that some first-class assays have been reported very little is as yet known of the extent or quality of the find. Sofala is one of the oldest mining towns in Australia. Gold was discovered in the Taron River on June 19th, 1851, and the rush was the largest that had then taken place, and even the greater attractions at Ballarat and Bendigo a few months later failed to draw the people away from the town. Gold mining has been going on there ever since, but for the past 20 years it has been principally in the hands of the Chinese, and Sofala has become almost a Chinese town. From time to time reefs have been found, and small batteries erected, but the principal reefing centers have been Hill End, Hargreaves, and Tambaroora, from 25 to 40 miles further down the Taron. A rush took place at Neville near Carions, but the field is now deserted except by the prospectors. These have obtained a 23-oz. nugget and 7 dwts. of gold from 4 loads of wash dirt in 14 days, and are therefore still working. Several other rushes have taken place in various parts of the country.

Western Australia.—A 21-oz. nugget has been found at the Yilgarn rush, and several parties are said to be on good gold, the wash being richer than

any yet found in the Western colony. A big rush seems to be setting in.

Diamonds.—Great excitement was caused in Inverell, New South Wales, last week by a statement made by two diamond buyers from Melbourne, Messrs. Schut and Lawson, American gentlemen, after visiting Malacca, Round Mount, Collas Hill, and other mines, declared that large diamonds are being thrown away in the tailings. They made several purchases of stones which they declare to be very fine, but they are of opinion that many of the stones have a coating of foreign matter which prevents them from being recognized. The miners only save those which are bright looking, and it is very probable that they have thrown away numbers of valuable stones through ignorance.

CANADA.

(From our Special Correspondent.)

Ontario.—The first annual report of the new mining bureau has just been issued. The total value of the mineral products of Ontario for the year 1891, according to the estimates given in the report, were only \$4,705,673. Some of the principal items are as follows: Phosphate, \$50,800; salt, \$157,000; mica, \$31,200; silver, \$64,475; petroleum, \$1,209,558; and nickel, \$324,240. This is a very poor showing in view of the extent and variety of the mineral resources of the province. But it is almost impossible to interest Canadian capitalists in mining enterprises, right at their very doors, and instead of offering special inducements for outside capitalists to come in and develop our mines, the Ontario Government has enacted restrictive legislation, putting a royalty on ores. The effects of this short-sighted policy is quite apparent in this district. Since the new law was passed, now over eighteen months ago, not a single new company has started any actual mining operations here and very little development work of any kind has been done. Capital has been frightened away, even though the royalty is not to be exacted for a number of years on any of the mines, and the greater part of the nickel range was bought up before the new law came into force.

But in spite of all such artificial obstructions, things are beginning to look up in mining here this fall, with the prospects of considerable activity in the spring. The main cause of this welcome change is no doubt the increasing demand for nickel. The British Admiralty has been experimenting largely of late with nickel steel, and extensive orders have been placed for nickel steel armor for the numerous battle ships now in process of construction. Such armor has been proved to be distinctly superior to ordinary steel plates, and especially when used in thicknesses of 3 or 4 inches, according to a memorandum published by Lord George Hamilton for the guidance of the Imperial Parliament in voting the supplies for the Admiralty this year. Besides, mining men in the United States and elsewhere are beginning to know that a great many first class nickel properties are still to be had here, which are free from government royalties or conditions of any kind.

Coming to the mines, the smelter at the Coppercliff was closed down last week for repairs, a very large rock house has been erected at the Stobie, and a shaft house is being built at the Davis mine. All the other mines are working as usual, some of them with an increased number of hands. We have had no snow here yet this season, and the weather is very fine just now.

CHINA.

Gold Mines in Formosa.—The Tamsui correspondent of the Amoy "Gazette" writes: "The gold diggers seem to flock still to the diggings around the Keelung River marshes, but whether very much is secured as a reward for their arduous duties is the question. Many of the men working in these fields have had thorough training in this line of business in California, and the method they use for searching for gold is the same as used in that State. The 'circular shovel,' the 'box tray,' all add to make up their paraphernalia when they move from one unsuccessful spot to try another. There are about 2,000 workers on the fields."

GREAT BRITAIN.

The Northumberland miners, by an almost unanimous vote, have decided to accept 5% reduction of wages instead of going on a strike.

MEXICO.

(From our Special Correspondent.)

Messrs. Fraser & Chalmers have removed their office in Mexico from Chihuahua to El Paso, Tex., the latter being considered a more advantageous point for the command of the market, while at the same time the staff stationed there is able to hasten the passage of consignments of machinery through the Mexican Custom House. The El Paso office works as far south as Zacatecas and the agent in the City of Mexico transacts the business beyond that point.

Durango.

(From our Special Correspondent.)

The city of Durango has now a weekly paper, "El Globo," which issued its first number on November 1st.

The Omaha & Grant Smelting Company has es-

duction; the difficulties of the Mansfield works with water will lessen the European output. On the whole the statistical position of the trade greatly favors higher prices and this not through any artificial regulation of the market, but simply because consumption has overtaken production and the output is diminishing from natural causes; nearly all the mines are producing all they can in regular work.

Tin has been rather depressed and while there has been a discussion of the chances of the duty of 4c. becoming operative July 1st prices have given way slightly. Sales have been made at from 20.40 to 50 for spot and December delivery, but no business has been done for later.

The regular calls on the New York Metal Exchange have been resumed and the prices are now recorded with greater accuracy than for some time past. It is supposed that this action on the part of the Governors of the Exchange will result in more business being done on the floor.

The English market showed great firmness in the beginning of the week, but American orders failing to materialize, prices soon eased off to £93 17s. 6d. for spot and £93 17s. 6d. for futures, the closing prices.

Lead continues rather dull, with free sellers at 3.85, New York even a trifle below. The tendency is anything but firm, and so far the low prices established have failed to attract much attention.

The foreign market has shown more life and quotations are somewhat higher at £10 3s. 9d. @ 5s. for Spanish and 2s. 6d. higher for English lead.

Chicago Lead Market.—The Post-Boynton-Strong Company has telegraphed us as follows: "The market has been quiet and dull with nominal quotations of 3.67½c., but small sales have been made at 3.65. There is no quantity of lead pressing for sale yet; consumers are apathetic."

Spelter has been rather neglected and prices are reported as somewhat irregular. We still have to quote 4.45 New York.

The London quotations are £18 17s. 6d. for good ordinaries and 2s. 6d. higher for specials.

Antimony has lapsed into dullness, and is slightly easier in price. Cookson's at 11¼@12c., L. X. at 11@11½, and Hallett's at 10.70@80.

Nickel is featureless and obtainable at 53@55c.

Quicksilver.—The market continues exceedingly quiet. Quotations are as follows: London, £6 10s.; New York, \$37.50@38.50.

IRON MARKET REVIEW.

NEW YORK, Friday Evening, Nov. 18, 1892.

Pig Iron Production.—The following table gives the number of furnaces in blast and the estimated production of pig iron in the United States during the week ending Saturday, November 12th, 1892, and for the corresponding week ending Saturday, November 14th, 1891. Also the total estimated production from January 1st of each year to these dates. This table has been corrected by the official returns of the American Iron and Steel Association for the first six months of this year. The figures are in gross tons:

Pig Iron Production During Weeks Ending November 14th, 1891, and November 12th, 1892, and During Both Years to These Dates.

Fuel used.	Week ending				From Jan., '91.	From Jan., '92.
	Nov. 14, '91.		Nov. 12, '92.			
	F'cs.	Tons.	F'cs.	Tons.	Tons.	Tons.
Anthracite..	87	34,890	69	31,000	1,665,520	1,506,796
Coke	162	142,870	133	130,000	4,864,940	5,334,700
Charcoal.....	57	12,460	42	9,500	482,847	461,525
Total.....	306	190,190	244	170,500	6,953,307	7,903,021

Prices here are as last week. Southern, ex-steamer, No. 1 F., \$15.26; No. 2 F., \$14.26; No. 3 F., \$13.76; Gray Forge, \$13.01; Northern, tide-water, No. 1X, \$15; No. 2X, \$14; No. 2 plain, \$13.50; Gray Forge, \$13. Southern irons are quoted, nominally, 26c. higher than Northern. Buyers are not rushing to get either. The trade is hand to mouth. No fears are entertained that standard brands will be worth less two or three months from to-day than they are at present. As one dealer expressed it, "We are down cellar now, and nothing below us." It is difficult to say just what reaction is expected or even hoped. It will probably be some time before the upper grades get to \$15.75 or even \$15.50, unless there is an advance in freights. The convention of Traffic Managers, called at the instance of Wm. P. Clyde, seems to have left things pretty much as they were, but a meeting of the Rate Committee will be held Dec. 14th. It is not a favorable time for an advance in rates. Pig iron has as much as it can do now without meeting an unexpected adversary in the guise of increased freight rates.

Spiegelisen and Ferromanganese.—Ferro 80% has been sold at something above \$61.00 and is firm. Spiegel, \$26 50, with no special movement.

Steel Rails.—The market is dull at \$30.00. The reduction spoken of has not yet been announced. The 23,000 miles of railway, proposed and projected for 1892, have not covered more than 3,000 miles up to date. If the other 20,000 miles are to show up before Christmas it is high time something was seen off them.

Rail Fastenings.—Prices rule as follows: Fish and angle plates, 1.55@1.65c. at mill; spikes, 1.90@2c.; bolts and square nuts, 2.40@2.70c.; hexagonal nuts, 2.70@2.80c., delivered.

Merchant Iron and Steel.—Prices stand: Musket's special, 48c.; English tool steel, 15c. net; American tool steel, 6¼@7¼c.; special grades, 13@18c.; crucible machinery steel, 4.75c.; crucible spring, 3.75c.; open hearth machinery, 2.25c.; open hearth spring, 2.30c.; tire steel, 2.25c.; toe calks, 2.25@2.50c.; first quality sheet, 10c.; second quality sheet, 8c.

Structural Iron and Steel.—We quote: Beams, 2.3@2.55c., except for 20-in. beams which are 2.75c.; angles, 1.95@2.15c.; sheared plates, 1.90@2.10c.; tees, 2.30@2.60c.; channels, 2.35@2.50c.; universal plates, 2@2.10c.; bridge plates, 2@2.10c.; steel boops, 1.90@8c. All on dock.

Buffalo. Nov. 17.

(Special Report by Rogers, Brown & Co.)

The volume of business continues large, with an impulse quite general among buyers to place contracts covering requirements for all or part of 1893. Prices are strong, and on the whole a much healthier tone pervades all branches of the trade than has existed for a long time past. Advances from the South received as this is going to press indicate that another advance in Southern iron is likely to be made within the week. We quote below on the cash basis f. o. b. cars Buffalo: No. 1 X. Foundry strong coke iron Lake Superior ore, \$15.25; No. 2 X. Foundry strong coke iron Lake Superior ore, \$14.50; Ohio strong softer, No. 1, \$15.50; Ohio strong softer, No. 2, \$14.50; Jackson County silvery, No. 1, \$17.30; Jackson County silvery, No. 2, \$16.80; Lake Superior charcoal, \$17.00; Tennessee charcoal, \$18.00; Southern soft, No. 1, \$14.40; Alabama car wheel, \$19; Hanging rock charcoal, \$20.50.

Chicago. Nov. 17.

(From our Special Correspondent.)

Outside of the complications wrought by the national election there are still the same characteristics which have marked the iron market here for a number of weeks—activity and strength. It is quite probable, though, that some new enterprises which have been planned and all but completed, in the carrying out of which a good deal of iron would be consumed, will be temporarily postponed. A number of producers of crude iron and manufacturers of the finished material have been interviewed, and the general opinion obtains that there will be no great disturbance in either branches, at least, not for some time. With furnace men and mill owners the principal cost is wages, and in the event of these being reduced to European standards this country could probably supply a large proportion to the outside world.

The steadily decreasing stock of crude iron is one of the most encouraging features, and local manufacturers feel hopeful of the future. Agents of Southern furnace companies hold firmly to the recent small advances, and some of them are out of the market on certain grades for a while at least. Manufactured iron and steel in the form of bars and sheets is less active, and the same may be said of structurals and plates from mill. In other material there is little change to note.

Pig Iron.—That there is less inquiry for iron is scarcely to be wondered at considering the exciting events of the past week, notwithstanding which there has been and is a fair demand for local coke iron, and small orders have been sufficiently numerous to aggregate moderate tonnage. Several contracts for lots of 500 to 1,000 tons were also booked this week, but on the whole the general volume is light as compared with the previous record. The upward tendency now noted will, of course, largely depend on the buying movement, if curtailed to any great extent. There may be a weakening; *au contraire*, if the activity continues prices will grow stronger. Lake Superior charcoal iron is in fair demand, and the larger furnaces now refuse to sell at less than \$16.75, and some orders have been entered at \$17. Southern iron is in fair demand, and a number of inquiries are noted for extended deliveries all through 1893, commencing in January. The market at present is firm and reassuring.

Quotations per gross ton f. o. b. Chicago, are Lake Superior charcoal, \$16.07@17.25; Lake Superior coke, No. 1, \$14.25@14.75; No. 2, \$13.75@14; No. 3, \$13.25@13.75; Lake Superior Bessemer, \$15.50; Lake Superior Scotch, \$15@15.50; American Scotch, \$16.50@17; Southern coke, foundry No. 1, \$14.50; No. 2, \$13.10; No. 3, \$12.85; Southern coke soft, No. 1, \$13.85; No. 2, \$13.10; Ohio silveries, No. 1, \$17; No. 2, \$16.50; Ohio strong softeners, No. 1, \$17; No. 2, \$16.50; Tennessee charcoal, No. 1, \$17; No. 2, \$16.50; Southern standard car wheel, \$20@22.

Steel Billets and Bars.—Inquiry and demand are alike fair, but mill capacity is engaged for at least 60 days. Quotations are unchanged, at \$25.50@26 for billets and \$35 for rods.

Structural Iron and Steel.—Large mill orders are scarce, and the demand now is mainly confined to small quantities for quick shipment. Some figuring is being done for early spring work, on which prices are easy. Quotations, car lots, f. o. b. Chicago, are as follows: Angles, \$2@2.20; tees, \$2.35@2.45; universal plates, \$1.95@2; sheared plates, \$1.95@2; beams and channels, \$2.35@2.50.

Plates.—Agents report an active warehouse demand for all the material they can get and heavy steel sheets are about \$2 a ton higher. De-

liveries continue slow from mill, and tubes are firmer. Steel sheets, 10 to 14, \$2.30@2.40; iron sheets, 10 to 14, \$2.20@2.30; tank iron or steel, \$2.10@2.15; shell iron or steel, \$2.75@3; firebox steel, \$4.25@5.50; flange steel, \$2.75@3.00; boiler rivets, \$4.00@4.15; boiler tubes, 2¼ in. and smaller, 60%; 7 in. and upward, 70%.

Merchant Steel.—Small lots for immediate shipment are active for soft steel bars from mill and warehouse. Spring steel, O. H., is also in better demand. Tool steel for the season is in good request. We quote: Tool steel, \$6.50@6.75 and upward; tire steel, \$2.10@2.20; toe calk, \$2.40@2.50; Bessemer machinery, \$2.10@2.20; Bessemer bars, \$1.75@1.80; open hearth machinery, \$2.40@2.60; open hearth carriage spring, \$2.25@2.30; crucible spring, \$3.75@4.

Galvanized Sheet Iron.—Stocks in agents' warehouses are depleted and it is almost impossible to obtain standard sizes and gauges. Discounts remain unchanged at 70% off on Juniata and 70% off on charcoal, and jobbing quantities at 67½% off on the former and 70% off on the latter.

Black Sheet Iron.—Quite a falling off is noted in the demand for the lighter gauges, but mills are well sold up and shipments still slow. Quotations are steady at \$2.85@2.90 for No. 27 common. Steel slats are steady at \$3.05@3.10. Jobbers quote ¾c. for steel and 3/10c. for iron from stock.

Bar Iron.—Demand is quiet, especially from car builders. An ordinary car specification for 500 tons was placed at equal to 1.60c. Chicago, the freight rate from mill being 11c. This is better than mills in this vicinity will do. Miscellaneous consumers are buying lightly. Mill lots are quoted at 1.53@1.65c., half extras, and agents of Youngstown mills ask 1.65c. here or 1.50c. mill. Warehouse orders are filled at 1.80@1.90c. rates.

Nails.—Wire nails are in good demand from mill at \$1.65 base Chicago and orders are booked at those figures. Jobbing price is \$1.70 from stock. Steel cut nails are in moderate request at 1.62½@30c. average, and jobbers quote \$1.65@1.70 from store in small quantities.

Steel Rails.—Rumors are current in the East that prices on standard railroad sections are to be reduced; the mills here state that it is idle gossip not worthy of notice. Demand is light and quotations steady at \$31@32 mill. Track material is quiet at 1.70c. for iron or steel splice bars; spikes, \$2.05@2.15 for 100 lbs.; track bolts, hexagonal nuts, \$2.65; square, \$2.55.

Scrap.—Is again very quiet and dealers accumulating stock. Prices are easier. No. 1 railroad, \$15.50; No. 1 forge, \$15.00; No. 1 mill, \$9.50; fish plates, \$16.50; axles, \$19; horseshoes, \$16; pipes and flues, \$7; cast borings, \$6; wrought turnings, \$8; axle turnings, \$9.50; machinery castings, \$10; stove plates, \$6.50; mixed steel, \$10.50; coil steel, \$15; leaf steel, \$15.50; tires, \$14.50.

Old Material.—Iron rails are again quiet and not in demand here at \$18.25@18.50, nominally. Steel rails are dull at \$12.50@15, as to length, condition, etc. Car wheels are quiet at \$14.75@15, i. e., \$2 less than Lake Superior charcoal iron.

Louisville. Nov. 12.

(Special Report by Hall Bros. & Co.)

The market remains strong, but buying has been in comparatively small quantities during the past week. The further heavy reductions in stocks lend additional encouragement and add much to the already strong market, but it is not expected to immediately put prices up further, and the more conservative furnace men are rather inclined to let well enough alone for a while at least. All things considered the outlook is very promising for a long period of activity in iron.

Hot Blast Foundry Irons.—Southern coke No. 1, \$13.50@13.75; Southern coke No. 2, \$12.50@12.75; Southern coke No. 3, \$12@12.75; Southern charcoal No. 1, \$16@17; Southern charcoal No. 2, \$15.50@16.

Forge Irons.—Neutral coke, \$11.50@12.00; mottled, \$11@11.25.

Car Wheel and Malleable Irons.—Southern (standard brands), \$20@21; Southern (other brands), \$18.50@19.50; Lake Superior, \$19.50@20.50.

Philadelphia. Nov. 17.

(From our Special Correspondent.)

Pig Iron.—Symptoms of weakness appear on the surface of trade. Makers and brokers say that they have made such large sales of pig iron for forward delivery, that inactivity for two or three weeks to come will not affect prices in the least. Buyers who had intended to make still larger purchases for midwinter delivery, are disinclined to extend contracts at the present time. At the same time, the market is strong and steady for all kinds of pig iron at ante-election figures. No. 1 is being worked off among foundries at \$15@15.50. Stove men are taking No. 2 at \$14@14.50. Mill men are not taking forge just now at any price, having bought as much as they care for; but makers say \$13 is the ruling price for good brands. Bessemer is worth \$16 for standard. The symptoms of weakness are simply a hesitancy among large consumers to continue active buying as they have been doing.

Ferro-Manganese.—Small lots of 80 per cent. are selling at \$60.

Steel Billets.—Business is inactive. Small lots

are selling at \$26.50 to \$27. Large buyers will not pay more than \$26 for midwinter.

Muck Bars.—Dullness prevails in all mills, but the probability is that buyers do not care to extend purchases. The present selling price is \$25.50.

Merchant Iron.—The demand for merchant bars has slackened up a little. Large buyers, who might under certain conditions place orders at present, are waiting to see what will happen. This is as good as a shading of one-twentieth, and selling prices are now 1'65 to 1'70.

Skelp.—Prices have been depressed by sharp competition to 1'60 and less.

Wrought Iron Pipe.—Very little new business has been done this week. Discounts on butt-welded black, 57½.

Nails.—A good business has been done this week in nails. Some large buyers have purchased stocks for the winter at prices which makers decline to state.

Sheet Iron.—Stocks are run down, and demand continues active. Card rates for best refined, 2'75@3'50.

Plate and Tank Iron.—Business just now seems to be slack, but if the statements made are true, as to the placing of heavy contracts by railroad companies and other users of steel, it is probable that the plate mills will book some heavy orders very soon. Steel plate is 1'85; shell, 2'20; flange, 2'50, and firebox, 2'70.

Structural Material.—The situation is unchanged both as to business and prices. Mills are well equipped with business.

Steel Rails.—No new business is reported this week. Quotations, \$30. On or two large orders are on the market.

Old Rails.—Old rails are quoted down as low as \$18 for iron, and \$15 for steel.

Pittsburg. Nov. 17.
(From our Special Correspondent.)

Raw Iron and Steel.—The outlook for the iron and steel trade for the balance of the year is a good one. The undertone of the market seems to be gaining strength daily; there is no big boom that is calculated to derange trade and place a false value on products. There is decidedly a better feeling among dealers generally. The most marked features at the present time are the scarcity of the best brands of pig iron and the gradual tendency to higher values. There is little iron pressing upon the market at present, prices are actually as well as sentimentally higher, and consumers who formerly bought for immediate requirements only are now taking rather more than they need at once. The sales are quite satisfactory in volume, and there is but little haggling about prices. Some makers for certain brands are now obtaining 25¢-35¢ per ton over the nominal quotations on new orders.

If the market holds steady for thirty days longer a general advance may be expected. The reports from the Mahoning and Shenango valleys are very favorable for makers; the demand has been active and sales of bessemer pig large, extending for the first quarter in the new year. Prices advanced 25¢-35¢ per ton above those that ruled a short time ago. "Cold Short," an excellent authority on iron matters, sizes up the situation thus: "A temperate but distinct improvement is developing to compensate the pig iron producers for the long season of depression they have had to submit to, and if this change for the better is handled soberly and not strained before it reaches greater development, it will gradually strengthen and very probably endure throughout the year. Haste to avail of all there is in this new born, and therefore immature and uncertain opportunity is exactly what should be avoided. If there is really any reason for the change, and it has the proper degree of strength behind and in it, enough of an opportunity will be developed to reach all round."

Southern pig iron is coming in for a share of the current business, some buyers refusing to place orders for Northern iron at the prices asked. This is especially true of competing points, when the product of the Southern furnaces can better meet the Northern article in the matter of freights. An Eastern dealer has this to say: The Western mills are close competitors for plate and structural material and a number of orders from them have been taken by Pittsburg works. Pig iron—The market is in excellent shape, and although there is a very considerable increase in the output there is no weakening in prices. Stocks have been melting away to the extent of about 20,000 tons per week, so there can be no question in regard to consumption.

Coke Smelted Lark and Native Ore.

10,000 Tons Bessemer at Valley Furnace, Jan., Feb.	\$12.75 cash.
5,000 Tons Bessemer at Valley Furnace, 1st 3 mos 1893.	13.80 cash.
3,500 Tons Bessemer.	14.00 cash.
2,000 Tons Bessemer.	14.00 cash.
2,000 Tons Bessemer at Valley Furnace, Jan., Feb.	13.75 cash.
1,500 Tons Bessemer, Jan., Feb., March, 1893.	14.00 cash.
1,000 Tons Grey Forge.	12.50 cash.
1,000 Tons Grey Forge.	12.50 cash.
1,000 Tons Grey Forge.	12.50 cash.
750 Tons Standard Bessemer.	14.25 cash.
500 Tons off Bessemer.	13.25 cash.
500 Tons Grey Forge.	12.50 cash.
500 Tons Grey Forge.	12.50 cash.
500 Tons Bessemer, Dec., Jan.	14.00 cash.
250 Tons No. 1 Foundry.	14.50 cash.
250 Tons No. 2 Foundry.	13.50 cash.

Charcoal.

100 Tons No. 2 Foundry.	19.00 cash.
100 Tons No. 2 Foundry.	19.00 cash.
100 Tons Cold Blast.	26.00 cash.
50 Tons Cold Blast.	26.00 cash.
50 Tons Hot Blast.	18.60 cash.

Steel Blooms, Billets and Slabs.

3,000 Tons Billets, Jan., Feb. and March, 1893.	23.50 cash.
3,000 Tons Billets, Jan., Feb., at mill.	23.50 cash.
2,000 Tons Billets, first three months 1893, at mill.	24.25 cash.
500 Tons Billets and Slabs, Jan.	24.50 cash.
500 Tons Billets, spot.	25.00 cash.
500 Tons Billets, extra spot.	26.00 cash.
500 Tons Billets, Nov.	24.75 cash.

Muck Bar.

1,000 Tons Neutral, Dec. and Jan, 1893.	24.75 cash.
500 Tons Neutral, Dec.	24.75 cash.
500 Tons Neutral, Dec.	24.75 cash.

Skelp Iron.

1,000 Tons Sheared Iron.	1.82½ 4 m.
800 Tons Wide Grooved.	1.65 4 m.
600 Tons Narrow Grooved.	1.62½ 4 m.

Skelp Steel.

500 Tons Wide Grooved.	1 50 4 m.
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Steel Wire Rod, five-gauge American.

400 Tons, Five-Gauge, American, at mill.	32.10 cash.
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Sheet Bars.

800 Tons Sheet Bars, at mill.	30.25 cash.
350 Tons Sheet Bars, at mill.	29.75 cash.

Permananese.

56 Tons, 80%, delivered.	62.50 cash.
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Old Iron and Steel Rails.

1,000 Tons American T's.	20.10 cash.
500 Tons American T's.	20.25 cash.
500 Tons American T's.	20.50 cash.
500 tons Old Steel Rails.	16.00 cash.

Scrap Material.

550 Tons No. 1 R. R. W. Scrap, net.	16.00 cash.
400 Tons No. 1 R. R. W. Scrap, net.	16.00 cash.
300 Tons Mixed Steel Scrap, gross.	15.25 cash.
300 Tons No. 1 Cast Scrap, gross.	12.00 cash.
300 Tons Mixed Steel Scrap, gross.	15.25 cash.
200 Tons Iron Axles, net.	24.00 cash.
200 Tons Old Car Wheels, gross.	13.75 cash.
100 Tons Wrought Turnings, gross.	10.00 cash.

COAL TRADE REVIEW.

New York, Friday Evening, Nov. 18.

Statement of shipments of anthracite coal (approximate) for week ending November 12th, 1892, compared with the corresponding period last year.

Regions.	Nov. 12, 1892.		Nov. 14, 1891.		Difference.
	Tons.	Value.	Tons.	Value.	
Wyoming Region....	446,522	528,082	Dec. 528,082	Dec. 63,560	
Lehigh Region.....	128,477	147,343	Dec. 147,343	Dec. 18,866	
Schuylkill Region....	251,040	368,588	Dec. 368,588	Dec. 117,548	
Total.....	844,039	1,044,013	Dec. 1,044,013	Dec. 199,974	
Total for year to date	36,060,448	33,748,317	Inc. 1,312,131		

Statement of shipments of anthracite coal for month of September, 1892, compared with the corresponding period last year:

Compiled from the returns furnished by the mine operators.

Regions.	October, 1892.		October, 1891.		Difference.
	Tons.	Value.	Tons.	Value.	
Wyoming Region....	2,208,111.06	2,320,534.06	D. 112,423.00		
Lehigh Region.....	671,027.07	700,155.03	D. 29,127.16		
Schuylkill Region....	1,180,937.10	1,475,845.03	D. 294,857.13		
Total.....	4,060,126.63	4,496,534.12	D. 436,408.09		

Regions.	Year to date, 1892.		Year to date, 1891.		Difference.
	Tons.	Value.	Tons.	Value.	
Wyoming Region....	19,088,913.16	17,340,626.07	I. 1,668,287.09		
Lehigh Region.....	5,223,692.01	5,214,512.14	I. 9,179.07		
Schuylkill Region....	10,339,244.15	10,177,668.14	I. 161,576.01		
Total	34,571,850.12	32,732,807.15	I. 1,839,042.17		

The stock of anthracite coal on hand at tide-water shipping points October 31st, 1892, was 680,563 tons; on September 30th, 1892, 638,301 tons; increase, 42,262 tons.

PRODUCTION OF BITUMINOUS COAL for week ending November 12th, and year from January 1st.

EASTERN AND NORTHERN SHIPMENTS.

	1892.		1891.
	Week.	Year.	
Phila. & Erie R. R.....	2,262	79,903	145,316
Cumberland, Md.....	79,882	3,320,237	3,625,869
Barclay, Pa.....	1,075	59,694	165,620
Broad Top, Pa.....	15,675	546,648	439,194
Clearfield, Pa.....	84,105	3,449,470	3,475,336
Allegheny, Pa.....	33,115	1,121,851	1,091,872
Beach Creek, Pa.....	34,721	1,976,308	2,081,746
Pocahontas Flat Top.....	61,623	2,288,536	1,982,777
Kanawha, W. Va.....	96,227	2,206,143	2,083,949
Total	408,685	15,048,870	15,116,679

*Week ending October 21st.

WESTERN SHIPMENTS.

	1892.		1891.
	Week.	Year.	
Pittsburg, Pa.....	27,968	1,096,433	1,107,243
Westmoreland, Pa.....	51,762	1,525,246	1,998,508
Monongahela, Pa.....	14,038	577,042	518,445
Total.....	88,768	3,198,721	3,324,196

Grand total..... 497,453 18,247,591 18,440,875
PRODUCTION OF COKE on line of Pennsylvania R.R. for the week ending November 12th, 1892, and year from January 1st, in tons of 2,000 lbs.: Week, 111,564 tons; year 4,679,188 tons; to corresponding date in 1891, 3,736,466 tons.

Anthracite.

On the 15th at Trenton, N. J., Chancellor McGill stated that he would hear argument in the matter of the receivership of the Jersey Central, December 1st. The case will probably be decided in January, and this delay is not too great when one considers the magnitude of the interests involved.

The rumors that some of the companies were working in excess of their allotments for the month and that prices on standard grades were subject to cut do not seem to be well founded. It is not likely that the Reading has \$7,000,000 worth of unsold coal above ground, as was reported in Philadelphia this week. There is no doubt of the accumulation of stocks not only at the mines but also at Port Richmond, and along the Jersey Central as at Elizabethport, Plainfield, and between these points and New York, as also at Amboy and Port Liberty. A considerable amount of stock is also held at the New England depots along the Reading system.

The fixed charges of the Reading for December are about \$750,000, for January, \$1,250,000, and for February, \$3,250,000, on the assumption that full payment will be made of the preferred interest. If to these figures be added the payments on the Lehigh Valley lease, and the amount required for the Lehigh coal and part of the Wyoming, it does not appear that the Reading is in the mood for any disturbance of the general market.

The embryo projects which, when safely matured, are to give it a firmer grip upon the trade may be connected with its great friendliness towards the Baltimore & Ohio. The traffic agreement with the Buffalo, Rochester & Pittsburg, taken with the Baltimore & Ohio scheme might alter its relations towards the soft coal trade. Anthracite cannot well enter as a contestant for ground already occupied by soft coal. If it holds its own against its great rival it will be as much as it can do. As to any serious advance, under present conditions, that is out of the question.

Bituminous.

There is still a lack of shipping facilities, although some large producers say they see daylight. The ice port shipments will, in the nature of things, soon be completed, and attention can then be turned toward business nearer home. The Baltimore & Ohio has ordered 60 first-class locomotives, with 40 others to follow. Two thousand box cars and 500 gondolas have also been ordered by this road, and it has contracted with the South Baltimore Car Works for the repair of 200 to 400 cars per month.

The H. C. Frick Coke Company are endeavoring to replace anthracite with crushed Connellsville coke.

It is divided into regular anthracite sizes, egg, stove, small stove and nut, and the claim is made that four tons of it will go further than five tons of the best anthracite. In the West and Northwest crushed coke is being used to some extent in stoves and is said to give satisfaction. Truly, the anthracite men are having a lively time! Soft coal on one side, crushed coke on the other, and stocks behind! A very wise man, when asked to prophecy concerning the events of the future was accustomed to reply, "Wait and see." But the trouble is that, as a general rule there is far more waiting than seeing.

Shipping rates remain as last week. From Philadelphia to Boston, Salem and Portland are 80¢@85¢; to Gardner and Bangor \$1.00 and to wage; to Portsmouth and Bath 85¢@90¢. From Newport News and Norfolk to Boston, Salem and Portland, 80¢.; and to Sound ports, 70¢@80¢.; from Baltimore to Boston, 85¢@90¢.

Boston. Nov. 17.

(From our Special Correspondent.)

There is very little doing in the anthracite coal market at present. The dealers here are all well stocked up and are not in need of fresh supplies. The companies are maintaining prices well. The companies are not taking orders for delivery after December 1st at present prices.

We quote f. o. b. prices at New York on free burning coal: Stove, \$4.75; egg, \$4.10; free broken, \$4; chestnut, \$4.65. Lykens Valley (at Philadelphia): broken, \$4.85; egg, \$5.45; stove, \$6; chestnut, \$5.

The soft coal situation is a form one. It is rather difficult to get soft coal at either Baltimore or Philadelphia, consequently prices are firm. George's Creek coal on cars here is worth from \$3.65@3.65 per ton on cars. Clearfield is strong at \$3.25 per ton.

Freight rates are still very firm, and tonnage is becoming scarcer.

We quote from New York to Boston 50¢@60¢.; from Philadelphia to Boston, 75¢@85¢.; to Bath, 90¢@1; to Providence, 70¢.; from Baltimore to Boston, 85¢@90¢.; Newport News to Boston, 80¢@—; Sound Points, 70¢@75¢.

In a retail way the dealers are doing a fairly good business, but not as much as they were a few weeks ago as the heavy buying is now practically over.

Buffalo. Nov. 14.

(From our Special Correspondent.)

Trade in anthracite coal during the last week presented no special incidents. Prices and demand unchanged. Weather on the whole mild, although occasionally ibernometer below freezing point and then again up to summer heat.

Bituminous coal in good demand and prices firm; supply about adequate for trade requirements. The scarcity of cars is considered by purchasers a drawback, but it prevents an accumulation of loads on track and steadies the market materially.

Coke in good demand and steady. Coal freights by lake firm, with shippers anxious

to hurry forward their last cargoes before navigation closes. See annexed figures for movement.

The new port of Conneaut, Lake Erie, has had large docks constructed lately with the expectation that the coal and iron ore trade will insure a handsome profit to the owners thereof. The expenditure on the new docks of the Pittsburg, Chenango & Lake Erie Co. already foot up \$250,000.

A new car wheel works has been established here with a capital of \$110,000.

The Buffalo agency of "Bradstreet's," which covers Western New York and Pennsylvania, has secured for superintendent, Mr. Francis A. Board, who entered upon his duties yesterday. For several years Mr. Board has been clerk here with the Pennsylvania Coal Company. He has a most satisfactory record in all that tends to make a man honored and respected among his associates. Mr. Franklin Selleck will succeed Mr. Board in the Pennsylvania company's office.

The National Transportation Association is now in session in this city, holding its annual meeting. The attendance was not large, but representatives from Chicago, Buffalo, Minneapolis, Cincinnati, Philadelphia, Peoria, Detroit, Milwaukee, Louisville, Cleveland, Baltimore, also the Chicago Freight Bureau and the Millers' National Association.

Vessel men say that no such continual gales have prevailed on the Lakes since 1867 as during the past three weeks. In that year the wind blew a gale from some direction all through November. Navigation this year was practically suspended for two days on Lakes Michigan, Huron and Superior during the period named.

The Champlain, Black River, Oswego Cayuga and Seneca canals will be closed on Wednesday, November 30th, at midnight, and the Erie Canal on Monday, December 5th, at midnight, unless sooner closed by ice.

The coal traffic through the Sault Ste. Marie Canal this season to November 1st aggregated 2,688,939 net tons as compared with 2,317,735 net tons in 1891, 1,983,463 net tons in 1890 and 1,467,012 net tons in 1889.

The movement of coal westward from this port by lake from November 9th to 15th, both days inclusive, aggregated 143,675 net tons, distributed about as follows: 61,700 to Chicago, 40,100 to Milwaukee, 22,800 to Duluth, 6,200 to Superior, 1,000 to Racine, 550 to Saginaw, 1,300 to Lake Linden, 4,150 to Toledo, 550 to Detroit, 3,700 to Port Huron, 325 to Bay City, 1,000 to Gladstone, 100 to Alpena and 200 to Oscoda. The rates of freight were: 75c. to Chicago, 70c. to Milwaukee, 90c. to Sault Ste. Marie and Racine, \$1 to Fort MacInaw, 50c. to Port Huron, Alpena and Lake Linden, 40c. to Toledo, 35c. to Washburn, Superior and Duluth, 75c. to Oscoda, 35c. to Bay City, 45c. to Gladstone, 30c. to Detroit, and 40c. to Saginaw. Closing firm.

Movement of coal by canal for second week in November: Receipts, 1,965 net tons and shipments, 1,143 net tons.

Chicago. Nov. 17.

(From our Special Correspondent.)

The reported talk of an advance of 50 cents on hard coal in the east is ridiculed by shippers in this city, who say that any idea of higher prices at this season is perfectly absurd. Even the present circular is more or less weak, and a rise under the existing condition of large stocks and a comparatively quiet market would be preposterous. Another reason could be truthfully urged, we are now enjoying Indian summer in the West, and if it continues until the end of the month, which is quite possible, December will dawn with only a small amount of anthracite used by consumers. Of course the weather of the future is an unknown quantity, but should we experience only an ordinary winter season the stock to be carried over will be very largely in excess of last year. On the other hand, if we have a hard and severe winter stocks will be reduced.

Wholesale trade has shown a decided improvement during the past week from the country and city. That is to say, that orders from the outside for all-rail coal have been and are more numerous, and though individually small—five to ten cars—the aggregate tonnage is more satisfactory than it has been for some weeks. The Philadelphia & Reading company is now receiving a good supply of all-rail coal, and are in much better shape in that respect than the individual operators or those companies outside of the consolidation, some of which state that they could sell more car coal if they had it. There is a prospect for a better supply, but at this writing all the shippers, except as above, report very slow receipts. Retail coal continues active and is almost entirely confined to chestnut, showing that the present demand is from the smaller buyers, those who take from one to several tons at a time.

Bituminous coal of all descriptions from the best to the poorest apology for a fuel is active, and since last Saturday, Nov. 12th, many of the largest operators have found it utterly impossible to supply the demands made upon them. This of course has been brought about by the political excitement last week when many of the mines in Indiana, Ohio and Illinois were worked only two or three days. This condition is only temporary, and will probably right itself during the week, but at present it is causing the trade no end of inconvenience. Spot coal of any grade is not to be had to five to ten car lots, and premiums of fifty cents per ton have been paid in several instances for round lots. Hocking coal is in short supply for similar reasons, and also on ac-

count of the greater attention paid to lake trade, as the approaching close of navigation will soon stop traffic in that direction. Just at present the question is one of coal and not price. The threatened strike in the Springfield, Ill., district will, if carried out, be severely felt by the railroads on which the mines are situated. The men had formulated a scale of wages which has been submitted to mine owners, and demand a settlement this week.

Coke continues in good demand. Foundries are busy, and the outlook is excellent. Crushed coke is also becoming more active and inquiry from outside points steadily increasing. City dealers are also paying more attention to its merits as a substitute for anthracite, and a good business will be built up this season.

Quotations are: \$4.65 furnace; \$5.05 foundry; crushed, \$5.40 Conneville; West Virginia, \$3.90 furnace, \$4.10 foundry; New River foundry, \$4.75; Walston, \$4.65 furnace, \$5 foundry.

Circular prices are at the following rates: Lehigh lump, \$6.50; large egg, \$5.85; small egg, range and chestnut, \$6.10. Retail prices per ton are: Large egg, \$7.25; small egg, range and chestnut, \$7.25.

Prices of bituminous per ton of 2,000 lbs., f. o. b. Chicago, are: Pittsburg, \$3.40; Hocking Valley, \$3.20; Youghiogheny, \$3.25; Illinois block, \$1.90@2; Brazil block, \$2.60@2.75.

Pittsburg. Nov. 17.

(From our Special Correspondent.)

Coal.—The coal situation presents nothing new. Coal miners and operators appear as wide apart as ever; so far there has been no agreement, despite reports issued from both parties as to an ending of it. The Coal Exchange at its last meeting reaffirmed its previous declaration not to pay the 3/4c rate. Reports from mines along the river indicate that the majority of the coal diggers are still a unit in remaining out. One of the principal arguments made by the operators is that while the river miners will not work in river pits for 3c., they cheerfully walk five or six miles in order to work at that rate in railroad mines. At present there is a demand for railroad miners, but the lake shipments are expected to close in a short time and then it is anticipated that a change is likely to occur in the river miners' strike. A slight rise in the Ohio enabled boats that were detained on their way up, with empties, to reach port. The local coal trade is still in good condition. A large number of mills, furnaces and factories are dependent upon coal for fuel and the river coal men are getting their full share of trade. Coal is very firm in the lower markets. There are now about 5,333,000 bushels Pittsburg coal at New Orleans, against less than 3,000 hushels on November 1st, 1891.

Connellsville Coke.—Production continues at the rate of about 20,000 tons per day, but the shipment does not keep up to the 1,200-car mark. Some coke is being stocked in consequence. This is not from any lack of orders, but because of the inadequate car supply which has prevailed for several months. The foundry trade is excellent, but it suffers even more than the furnace trade for lack of cars. The railroads are suffering from a lack of motive power, as well as a lack of cars; the drought, which is about over, has been responsible for this. Taking this in consideration, with the improved condition of the iron market, it is reasonable to hope for better things in the coke business in the near future. Week's shipment, 6,928 cars, consigned as follows: To Pittsburg and river points, 2,120 cars; points west of Pittsburg, 3,535 cars; points east of Pittsburg, 1,273 cars; 127,680 tons. Prices firm, unchanged.

CHEMICALS AND MINERALS.

NEW YORK, Friday Evening, Nov. 18.

Heavy Chemicals.—There is no change to report in this market. It continues quiet, and the conditions prevailing at the time of our last report are unaltered. Attention is being devoted to the business for 1893, and activity will be experienced before long. Carbonated soda ash on the spot and for near by delivery is scarce, and most of the business done during the week has been for delivery next year. Caustic soda continues quiet, but steady, with no new features to report. Alkali has been in better demand and fairly steady. No change in the other articles: Our quotations to-day are as follows: Caustic soda, 60%, 3-17 1/2@3-27 1/2c.; 70%, 2-95@3-12 1/2c.; 74%, 2-97 1/2@3-15c.; 76%, 3-12 1/2@3-25c.; 77%, 3-12 1/2@3-25c. Carbonated soda ash, 48%, 1-57 1/2@1-60c.; 58%, 1-47 1/2@1-52 1/2c. Alkali 48%, 1-50@1-55c.; 58%, 1-45@1-50c. Sal soda, English, 1-02 1/2@1-05c.; American, 1-05@1-10c.; bleaching powder, 2-50@2-75c.

Acids.—The demand for the various acids continues active and manufacturers report that stocks of muriatic and nitric are light. In sulphuric a good business has been done. Altogether, the prosperity which has reigned in the acid market for several months past continues. There is no change in prices to report this week and we quote acid per 100 lbs. in New York and vicinity, in lots of 50 carboys or more: Acetic, \$1.60@2, according to quality; muriatic, 18", \$1@1.25; 20", 90c.@1.10; 22", \$1.25@1.50; nitric, 40", \$4; 42", \$4.50@4.75; sulphuric, 85c.@1.10; mixed acids, according to mixture; oxalic \$7.25@7.75. Blue vitriol is quoted all the way from \$3.25@3.75; Glycerine for nitroglycerine, 11 1/2@12 1/2c., according to quality and quantity.

Brimstone.—Owing to the further decline in the price of the Sicilian article a better business has been done in this market during the past week. Consumers of brimstone are famous for "holding off for lower figures." Dealers here declare that the bottom has been reached. We quote this week: Shipments (January-February) \$20@21 for best un-mixed seconds and \$19.50@20.50. There are no stocks on the spot and nominal quotations are \$24@25 for seconds and 75c. less for thirds.

Fertilizers.—There has been a brisk demand for various ammoniates and prices, where they have not advanced, have ruled firm and steady. The trade with the south is improving, owing to the strong advance in cotton. A fair number of sales is reported. Our quotations this week are as follows: Sulphate of ammonia, \$2.90@3.25 for bone goods and \$2.95@3 for gas liquor. Dried blood, \$2.30@2.37 1/2 per unit for high grade and \$2.25@2.30 for low grade; acidulated fish scrap, no stocks on hand; dried scrap, \$25; Azotine, \$2.25. Tankage, high grade, \$23.50@24; low grade, \$20@22, according to grade. Bone tankage, \$22.50@23.50; bone meal, \$23.50@25.50.

Double manure salts are unchanged. The price has been fixed by the syndicate's agents, and has not changed during the year. Quotations are as follows: \$1.13 1/2 cwt., basis 48@50%, in 50 ton lots, on foreign weights and analysis. High grade sulphate, \$2.13 cwt., basis 90% foreign weights and tests.

Phosphates.—Phosphate rock, Florida, 60@90%, is quoted from Punta Gorda at \$4.50 per ton of 2,240 lbs. Charleston rock is quoted at \$4.75@5 f. o. b. Charleston. Mr. Paul C. Trenholm, the well known phosphate broker, of Charleston, S. C., sends us the following interesting statistics, showing shipments of phosphate rock from that port for the month of October, 1890, 1891 and 1892:

Domestic—1890, crude, 22,016; ground, nil; 1891, crude, 18,885; ground, nil; 1892, crude, 19,587; ground, 876. Foreign—1890, crude, nil; ground, nil; 1891, crude, 100; ground, nil; 1892, crude, nil; ground, nil. Grand total, tons.—1890, crude, 22,016; 1891, crude, 18,985; 1892, crude, 19,587; ground, 876.

Kainit.—During the past week sales of kainit amounted to 1,300 tons; arrivals aggregated 1,850 tons. Prices continue as follows: \$8.75 for invoice weight and \$9 for actual weight, New York and Philadelphia; Southern ports \$1 higher.

Muriate of Potash.—There is no change in the position of this salt. Arrivals during the week aggregated 825 tons. New sales were 100 tons, for future shipments. Prices are: For 50 tons or over, New York or Boston, \$1.81 1/2; Philadelphia or Baltimore, \$1.84; Southern ports, \$1.80 1/2.

Nitrate of Soda.—The nitrate market has been strong during the week, and a fairly heavy business has been done. Quotations this week for nitrate on the spot are \$2.12 1/2@2.15.

Liverpool. Nov. 7.

(From Geo. G. Blackwell's Weekly Report.)

Minerals.—Our market has ruled pretty firm this week. Manganese: Arrivals have fallen off considerably, while stocks are very low. Prices, both for prompt and forward, have very much increased. Borate, 7d. per lb.; sulphate, £21 10s.; oxalate, 1s. 6d. per lb.; chloride, £15; carbonate, £12 10s., steady. Magnesite (raw lump) unaltered. Raw ground, £6 10s., and calcined £12 10s. Bauxite (Irish Hill brand) in good demand; lump, 20s.; seconds, 16s.; thirds, 12s. French chalk: Arrivals steady, while prices are unaltered, with a good demand. "Angel White" brand and "Silvery," 90s. to 92s. 6d.; prime quality, 90s. to 95s.; and superfine, 105s. Barytes: Carbonate, best lump, none offering; nuts, 70s. to 80s.; while finest white sulphate is in demand. "Angel White," No. 1, 70s.; No. 2, 60@65s.; No. 3, 45s. Pumice stone quiet. Iron ore flat, with little doing. Bilbao, Irish, and Cumberland easier. Santander and manganiferous quiet. Emery stone: Best quality in good demand both for home and export; No. 1 lump, £5 10s. to £6; smalls, £5 to £5 10s. Fuller's earth continues quiet; best lump, 55s.; fine impalpable ground, £7; "Emerald," ground, 80s. Scheelite, wolfram, tungstate of soda, and tungsten metal in good demand and prices are firm. Chrome ore: There is more doing and prices are firm. Antimony ore steady at £12 and metal £43 to £44. Asbestos very firm. Potters' lead ore, smalls, £10 10s. to £11. Calamine strontia sulphate (celestine) quiet. Lime-sparg steady, especially for English manufactured; old G. G. B. brand in demand at 50s. (ground). Felspar quiet. Fluorspar: Best quality scarce. Ferro-manganese steady. Plumbago: Spanish, £5; best Ceylon lump at last quotations; Italian and Bohemian, £4@£12 per ton; "Founders," £5@£6; Blackwell's "Mineraline," £10. French sand, 20s.@22s. 6d. Ground mica, £45@£50. China clay steady, common, 18s. 6d.; good medium, 22s. 6d.@25s.; best, 30s.@35s. (at Runcorn). Irish moss inquired for; medium, £12 10s. Bog ore (oxide of iron) steady; finest quality, 22s.@23s.

Chemicals are quiet. Bleaching powder is scarce just now, and prices for this year's delivery are from £7 7s. 6d.@£7 10s., booming at £15@£15 10s. Soda ash £5 6s. 3d. up. Caustic soda, 70% cream, £8 17s. 6d.; 70% white, £10. Bicarbonate, £6 15s. Nitrate of soda, 9s. 9d. Soda crystals, £3 7s. 6d. Salt cake, 34s. Chlorate of potash, 8 1/2d. Arsenic, £12 10s. Oxide of uranium, 15s. Sulphate of copper, £15. Chloride of magnesium (antiseptic) strong, at 45s.@50s. Montreal ashes: Pot, 25s.@27s.; pearl, 45s.@47s.

NEW YORK MINING STOCKS QUOTATIONS. DIVIDEND-PAYING MINES. NON-DIVIDEND-PAYING MINES.

Main table of New York Mining Stocks Quotations, listing companies like Adams, Alice, Amador, etc., with columns for dates (Nov. 12-18) and sales.

*Ex-dividend. †Dealt at in New York Stock Ex. Unlisted securities. ‡Assessment paid. †Assessment unpaid. Dividend shares sold, 18,380. Non-dividend shares sold, 13,500. Total shares sold, 31,880.

BOSTON MINING STOCK QUOTATIONS.

Main table of Boston Mining Stock Quotations, listing companies like Atlantic, Bodie, Bonanza Development, etc., with columns for dates (Nov. 11-17) and sales.

Dividend shares sold, 13,279. Non-dividend shares sold, 5,240. Total shares sold, 17,519.

DIVIDEND-PAYING MINES.

NON-DIVIDEND PAYING MINES.

Large table detailing mining companies with columns for Name and Location of Company, Capital Stock, Shares, Assessments, Dividends, and Date and amount of last payment.

DIVIDEND-PAYING MINES.

NON-DIVIDEND-PAYING MINES.

Main table with columns: Name and Location of Company, Capital Stock, Shares, Assessments, Dividends, Name and Location of Company, Capital Stock, Shares, Assessments. Lists various mining companies and their financial details.

G., Gold. S., Silver. L., Lead. C., Copper. B., Borax. * Non-assessable. † This company, as the Western, up to December 10th, 1881, paid \$1,400,000. ‡ Non-assessable for three years. § The Deadwood previously paid \$275,000 in eleven dividends and the Terra \$75,000. ¶ Previous to the consolidation in August, 1884, the California had paid \$31,320,000 in dividends, and the Cons. Virginia \$42,900,000. ** Previous to the consolidation of the Copper Queen with the Atlanta, August, 1885, the Copper Queen had paid \$1,350,000 in dividends. †† This company paid \$190,000 before the reorganization in 1880. ††† This company acquired the property of the Raymond & Ely Company which had paid \$3,075,000 in dividends. †††† Previous to this company's acquiring Northern Belle, that mine declared \$2,400,000 in dividends against \$425,000 in assessments.

STOCK MARKET QUOTATIONS.

Table with columns for Aspen, Nov. 12, and various stock names like Argentinum Junata, Aspen Deep Shaft, etc.

Table with columns for Baltimore, Md., Nov. 10, and various stock names like Atlantic Coal, Cons. Coal, etc.

Table with columns for Pittsburgh, Pa., and various stock names like Bridgewater Gas Co., Charliers Val. Gas, etc.

St. Louis, Nov. 16.

Table with columns for St. Louis, Nov. 16, and various stock names like Adams, American & Nettie, etc.

Helena, Mont.

Table with columns for Helena, Mont., and various stock names like Elizabeth, Eureka, Granite Mountain, etc.

Deadwood, Nov. 12.

Table with columns for Deadwood, Nov. 12, and various stock names like Bullion, Carthage, Golden Reward, etc.

COAL STOCKS.

Large table with columns for NAME OF COMPANY, Nov. 12, Nov. 14, Nov. 15, Nov. 16, Nov. 17, Nov. 18, and Sales.

Foreign Quotations.

Table with columns for London, Oct. 29, and various foreign stock names like Alaska Treadwell, Amador, etc.

Table with columns for Paris, Oct. 27, and various foreign stock names like East Oregon, Golden River, etc.

San Francisco, Cal.

Table with columns for San Francisco, Cal., and various stock names like Alpa, Alta, Belcher, etc.

CURRENT PRICES.

These quotations are for wholesale lots in New York unless otherwise specified. Acid-Acetic, chem. pure, 16c. 17 Commercial, in bbls. and cbsys. 0.15 @ 0.17 Carbonic, liquefied, 18c. 18c. 20 Chromic, chem. pure, 1.00 for batteries, 40 Hydrobromic, dilute, U. S. P., 25 Hydrocyanic, U. S. P., 45 Hydrofluoric, 20 Alcohol-95%, 2 gal., \$2.30 @ \$2.40 Absolute, 2 gal., \$3.80 Ammoniated, 2 gal., \$2.80 Alum-Lump, 2 cwt., \$1.75 @ \$1.80 Ground, 2 cwt., \$1.85 @ \$1.90 Powdered, 2 cwt., 0.41 @ 0.05 Lump ton, Liverpool, 45 Asphaltum-Asphaltum-Pure, 2 lb., \$1.25 Amalgamating solution, 2 lb., 60 Sulphate, 2 cwt., \$1.90 @ \$2.50 Ammonia-Sul., in bbls. lots, 0.02 @ 0.03 Carbonate, 2 lb., English and German, 0.07 @ 0.07 1/2 Muriate, white, in bbls., 0.08 @ 0.08 Aqua Ammonia-(in cbsys) 18° 0.03 @ 0.01 20° 0.04 @ 0.05 26° 0.05 @ 0.15 Autimony-Oxymur, 2 lb., 0.04 @ 0.06 Regulus, 2 lb., 0.10 @ 0.11 Argols-Red, powdered, 2 lb., 15 Arsenic-White, powdered 2 lb., 0.03 @ 0.03 Red 2 lb., 0.06 @ 0.07 Yellow, 0.08 @ 0.09 White at Plymouth, 2 ton, \$12 2 6 Asbestos-Canadian, 2 ton, \$50 @ \$300 Italian, 2 ton, c. i. f. L'pool, \$18 @ \$20 Ashes-Pot, 1st sorts, 2 lb., 4 75 @ 5 00 Pearl, 2 lb., 0.06 @ 0.06 1/2 Prime Cuban, 2 lb., 0.04 @ 0.05 Hard Cuban, 2 ton, \$28.00 @ \$30.00 Trinidad, refined, 2 ton, \$30.00 @ \$35.00 Egyptian and Syrian, 2 lb., 0.05 @ 0.07 Californian, at mine, 2 ton \$12.00 @ \$26.00 at San Francisco, 2 ton \$15.00 @ \$29.00 Barium-Carbonate, pure, 2 lb., 45 Carbonate, commercial, 2 lb., 0.05 @ 0.10 Chlorate, crystal, 2 lb., 75 Chloride, commercial, 2 lb., 0.05 @ 0.10 pure, 2 lb., 16 Iodide, 2 oz., 40 Nitrate, 2 lb., 0.06 @ 0.07 Sulph., Am. prime white, 2 ton \$17.50 @ \$19 Sulph., foreign, floated, 2 ton, \$21 @ \$23 Sulph., off color, 2 ton, \$11.50 @ \$14.00 Carb. lump, f. o. b. L'pool, 2 ton, \$6 No. 1, Casks, Runcom, " " \$3 15 0 No. 2, bags, Runcom, " " \$3 15 0 Bauxite-2 ton \$10.00 Bichromate of Potash-Scotch, 2 lb., 11 @ 12 American, 2 lb., 11 @ 12 Bichromate of Soda-2 lb., 0.09 @ 0.10 Borax-Refined, 2 lb., in car lots, 0.08 @ 0.09 San Francisco, 0.08 @ 0.08 1/2 Concentrated, in car lots, 0.07 @ 0.08 Refined, Liverpool 2 ton, \$29 Bromine-2 lb., 15 @ 20 Cadmium-Iodide-2 lb., \$5.50 Cadmium ton \$1.40 @ \$1.75 Precipitated, 2 lb., 0.05 @ 0.06 China Clay-English, 2 ton, \$13 @ \$18.00 Domestic, 2 ton, \$9 @ \$11 Chlorine Water-2 lb., 10 Chrome Yellow-2 lb., 10 @ 25 Chrome Iron Ore-2 ton, San Francisco, \$10.00 Chromalum-Pure, 2 lb., 40 Commercial, 2 lb., 12 Cobalt-Oxide, 2 lb., \$1.90 @ \$2.10 Copper-Sulph. English Wks. ton \$20 @ \$21 Vitriol (blue), ordinary, 2 lb., 0.03 @ 0.0 1/2 extra, 0.04 @ 0.04 Nitrate, 2 lb., 40 Copperas-Comm'n, 2 100 lbs., 90 @ \$1.00 Best, 2 100 lbs., \$1.35 @ \$1.50 Liverpool, 2 ton, in casks, \$2 @ \$2 10 20 Corundum-Powdered, 2 lb., 0.04 @ 0.09 Flour, 2 lb., 0.03 Cryolite-Powdered, 2 lb., bbl. lots, .03 Emery-Grain, 2 lb. (2 kg.), 0.15 @ 0.05 Flour, 2 lb., 0.02 @ 0.10 Epson Salt-2 lb., 0.02 @ 0.03 Feldspar-Ground, 2 ton, \$6.00 @ \$10.00 Crude, \$2.00 @ \$3.00 Fluorspar-Powdered, No. 1, 2 ton, \$30.00 French Chalk-Fuller's Earth-Lump, 2 ton, \$16 @ \$20 Glauber's Salt-in bbls., 2 lb., 0.1 @ 0.1 1/4 Glass-Ground, 2 lb., 10 Gold-Chloride, pure, crystals, 2 oz., \$12.00 pure, 15 gr. c.v., 2 doz., \$5.40 liquid, 15 gr. g. Chloride and sodium, 2 oz., \$5.50 15 gr. c.v., 2 doz., \$2.88 Oxide, 2 oz., \$2.25 Gypsum-Calcined, 2 bbl., \$1.25 @ \$1.50 Land Plaster, 2 bbl., \$1.25 @ \$1.50 Iodine-Resublimed, \$3.30 @ \$3 35 Iron-Nitrate, 40°, 2 lb., 0.1 @ 0.1 1/4 47°, 2 lb., 0.02 @ 0.02 1/2 Kaolin-See China Clay. Kieserite-2 ton, \$9 @ \$10 Lead-Red, American, 2 lb., 0.06 @ 0.07 1/2 White, American, in oil, 2 lb., 0.06 @ 0.07 1/2 White, English, 2 lb., in oil, .08 @ 0.08 1/2 Acetate, or sugar of, white, 0.06 @ 0.06 1/2 Granulated, 0.09 @ 0.10 Nitrate, 0.09 @ 0.10 Lime Acetate-A. Brown, 90c. @ 95c Gray, \$1.75 @ \$1.87 1/2 Litharge-Powdered, 2 lb., 0.06 @ 0.07 1/2 English flake, 2 lb., 0.09 @ 0.09 1/2 Magnesite-Crude, 2 ton of 1,015 kilos, \$14.75 Calcined, 2 ton of 2,240 lbs., \$22.00 Brick, 2 ton of 2,240 lbs., \$17.50 Manganese-Ore, per unit, \$23 @ 28 Oxide, ground, 2 lb., 0.02 @ 0.06 1/2 Mercuric Chloride-(Corrosive Sublimata) 2 lb., 62 @ 64

Muriate, 2 lb., 0.07 @ 0.07 1/2 Powdered, 2 lb., 0.04 @ 0.05 Lump ton, Liverpool, 45 Aluminate Chloride-Pure, 2 lb., \$1.25 Amalgamating solution, 2 lb., 60 Sulphate, 2 cwt., \$1.90 @ \$2.50 Ammonia-Sul., in bbls. lots, 0.02 @ 0.03 Carbonate, 2 lb., English and German, 0.07 @ 0.07 1/2 Muriate, white, in bbls., 0.08 @ 0.08 Aqua Ammonia-(in cbsys) 18° 0.03 @ 0.01 20° 0.04 @ 0.05 26° 0.05 @ 0.15 Autimony-Oxymur, 2 lb., 0.04 @ 0.06 Regulus, 2 lb., 0.10 @ 0.11 Argols-Red, powdered, 2 lb., 15 Arsenic-White, powdered 2 lb., 0.03 @ 0.03 Red 2 lb., 0.06 @ 0.07 Yellow, 0.08 @ 0.09 White at Plymouth, 2 ton, \$12 2 6 Asbestos-Canadian, 2 ton, \$50 @ \$300 Italian, 2 ton, c. i. f. 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Brown, 90c. @ 95c Gray, \$1.75 @ \$1.87 1/2 Litharge-Powdered, 2 lb., 0.06 @ 0.07 1/2 English flake, 2 lb., 0.09 @ 0.09 1/2 Magnesite-Crude, 2 ton of 1,015 kilos, \$14.75 Calcined, 2 ton of 2,240 lbs., \$22.00 Brick, 2 ton of 2,240 lbs., \$17.50 Manganese-Ore, per unit, \$23 @ 28 Oxide, ground, 2 lb., 0.02 @ 0.06 1/2 Mercuric Chloride-(Corrosive Sublimata) 2 lb., 62 @ 64 Powdered, 2 lb., 0.04 @ 0.05 Marble Dust-2 bbl \$1.25 Metallic Paint-Brown 2 ton, \$20 @ \$25 Red, \$20 @ \$25 Mineral Wool-Ordinary slag, .01 1/2 Ordinary rock, .02 1/2 Ground, 2 ton, .02 1/2 Mica-In sheets according to size. 1st quality, 2 lb., .25 @ \$6.00 Naphtha-Black, 2 lb., .25 @ \$6.00 Nitro Cake-2 ton, \$10.00 Ochre-Rocbelle, 2 lb., \$1.10 @ \$1.50 Washed Nat Ox'rd, Lump, 2 lb., 0.06 @ 0.06 1/2 Washed Nat Ox'rd, Powder, 2 lb., 0.07 @ 0.07 1/2 Golden, 2 lb., .03 @ .05 Domestic, 2 ton, \$12 @ \$20 Oils, Mineral Cylinder, light filtered, 2 gal., .14 @ .16 Dark filtered, 2 gal., .10 @ .13 Extra cold test, 2 gal., .20 @ .24 Dark steam refined, 2 gal., .09 @ .12 Phosphorus-2 lb., .50 @ .55 Precip., red, 2 lb., .82 @ .85 white, 2 lb., .85 @ .91 Plumbago-Ceylon, 2 lb., .04 @ .05 American, 2 lb., .05 @ .07 Potassium-Cyanide, 2 lb., C. P., .70 67%, 2 lb., .45 fused, .40 Bromide, domestic, 2 lb., .25 @ .28 Chlorate, English, 2 lb., .14 @ .15 Chlorate, powdered, English, 2 lb., .14 @ .15 Carbonate, 2 lb., by casks, 82%, 0.14 @ 0.15 Caustic, 2 lb., pure slick, .06 @ 0.05 Iodide, 2 lb., \$2.58 @ \$2.80 Nitrate, refined, 2 lb., .06 @ .08 Bichromate, 2 lb., .10 @ .11 1/2 Yellow Prussiate, 2 lb., .22 @ .23 Red Prussiate, 2 lb., .40 @ .45 Pumice Stone-Select lumps, 2 lb., 0.15 @ 0.15 Original cks., 2 lb., .01 @ 0.02 Powdered, pure, 2 lb., .01 @ 0.01 1/2 Pyrites-Non-cupreous, p. units, 12c. 1/2 Quartz-Ground, 2 ton, \$6.00 @ \$10.00 Kotten Stone, Powdered, 2 lb., 0.03 @ 0.03 1/2 Lump, 2 lb., .06 @ .07 Original cks., 2 lb., .04 @ 0.05 Rubbing stone, 2 lb., .03 @ 0.04 Sal Ammoniac-Lump, in bbls., 2 lb., 80c. Salt-Liverpool, ground, 2 sack, .70 Domestic, fine, 2 ton, \$7 @ \$7.50 Common, fine, 2 ton, \$4.50 @ \$5 Turk's Island, 2 bush, .26 @ .28 Salt Cake-2 ton, \$10.00 @ \$15.00 Saltpeter-Crude, 2 lb., .03 @ .04 Soapstone-Ground, 2 ton, \$5 @ \$5 Block and slab according to size. Sodium-Prussiate, 2 lb., .22 @ .24 Phosphate, 2 lb., .04 @ .05 Stannate, 2 lb., .06 @ .12 Tungstate, 2 lb., .0235 @ .0245 Sulphur-Nitrate, 2 lb., .39 @ .40 Sulphur-Roll, 2 lb., .32 Flour, 2 lb., .02 1/2 Sylvite, 27 @ 35, S. O. P., per unit, .40 Tale-Ground French, 2 lb., .01 @ .01 1/4 American No. 1, 2 lb., .014 @ .014 American No. 2, 2 lb., .06 Terra Alba-French, 2 lb., .65 @ .70 English, 2 lb., .6 @ .80 American, No. 1, 2 lb., .6 @ .70 American, No. 2, 2 lb., .45 @ .60 Tin-Crystals, in kegs or bbls., 14 @ 10 feathered or flossed, .20 Muriate, single, .07 @ .05 Double or strong, 54° F., .10 @ .15 Oxymur, or nitro, .14 Vermilion-Lump, English, 2 lb., 85 @ 90 Am. quicksilver, bulk, .57 @ .62 Am. quicksilver, bags, .58 @ .63 Chinese, .85 @ \$1.00 Trieste, .90 @ .96 American, .11 @ .12 Zinc White-Am. Dry, 2 lb., 0.14 @ 0.05 Antwerp, Red Seal, 2 lb., 0.06 @ 0.07 Paris, Red Seal, 2 lb., 0.07 @ 0.08 Muriate solution, .06 Sulphate crystals, in bbls., 2 lb., .08 1/4 THE RARER METALS. Aluminium-2 lb., 50 @ 65 Arsenic-(Metallic), per lb., .40 Barium-(Metallic), per gram, \$4.00 Bismuth-(Metallic), per lb., \$2.25 Cadmium-(Metallic), per lb., \$1.00 Calcium-(Metallic), per gram, \$10.00 Cerium-(Metallic), per gram, \$7.50 Chromium-(Metallic), per gram, \$1.00 Cobalt-(Metallic), per lb., \$6.00 Didymium-(Metallic), per gram, \$9.00 Erbium-(Metallic), per gram, \$7.50 Gallium-(Metallic), per gram, \$14.00 Glucinum-(Metallic), per gram, \$12.00 Indium-(Metallic), per gram, \$9.00 Iridium-(Metallic), per oz., \$7.00 Lanthanum-(Metallic), per gr., \$10.00 Lithium-(Metallic), per gram, \$10.00 Magnesium-(Metallic), per lb., \$4.00 Manganese-(Metallic), per oz., \$10.00 Chem. pure, per oz., \$10.00 Molybdenum-(Metallic), per gm., .50 Niobium-(Metallic), per gram, \$5.00 Osmium-(Metallic), per oz., \$65.00 Palladium-(Metallic), per oz., \$35.00 Platinum-(Metallic), per oz., \$7 @ \$8 Potassium-(Metallic), per lb., \$28.00 Rhodium-(Metallic), per gram, \$5.00 Rubidium-(Metallic), per gm., \$5.50 Rutherfordium-(Metallic), per gram, \$2.00 Selenium-(Metallic), per oz., \$1.50 Sodium-(Metallic), per lb., \$5 @ \$7.50 Strontium-(Metallic), per gm., \$6.00 Tantalum-(Metallic), per gram, \$9.00 Tellurium-(Metallic), per lb., \$5.00 Thallium-(Metallic), per gram, .20 Titanium-(Metallic), per gram, \$2.20 Thorium-(Metallic), per gram, \$17.00 Tungsten-(Metallic), per lb., .80 Uranium-(Oxide), per lb., \$5.00 Metallic, per gm., .20 Vanadium-(Metallic), per gm., \$2.00 Yttrium-(Metallic), per gram, \$2.00 Zirconium-(Metallic), per gm., .85 @ .90

Total shares sold, 513,333.